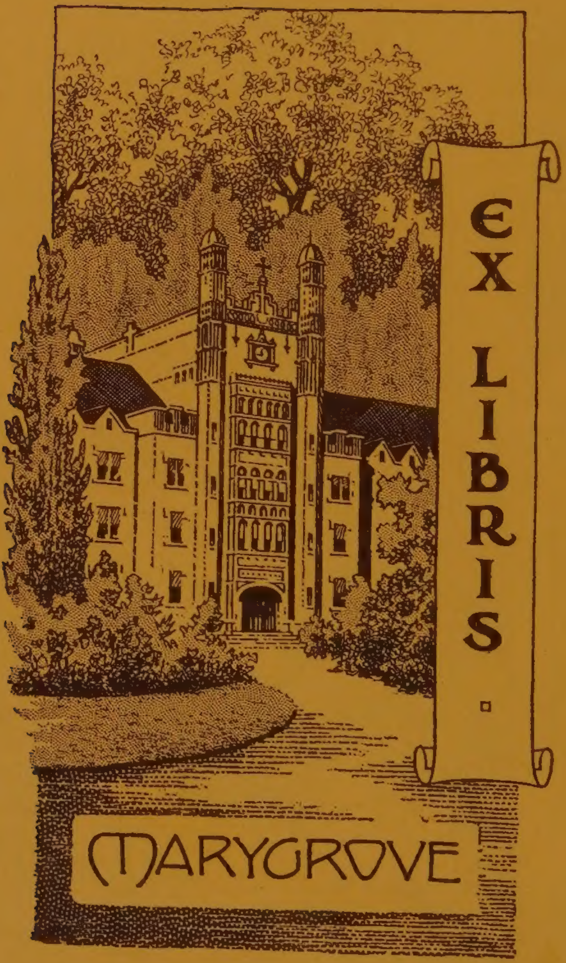
The Handbook Series

Evolution

PHELPS


EX LIBRIS
MARYGROVE

573
P51

WITHDRAWN

THE HANDBOOK SERIES

EVOLUTION

THE HANDBOOK SERIES

AGRICULTURAL CREDIT	$1.25
AMERICANIZATION, 2d ed.	1.80
BIRTH CONTROL	2.40
CAPITAL PUNISHMENT	2.40
CHILD LABOR	2.40
CLOSED SHOP, 2d ed.	2.00
DEBATERS' MANUAL	1.50
DISARMAMENT	2.25
EUROPEAN WAR, VOL. II	1.25
EVOLUTION	2.40
FUNDAMENTALISM VS. MODERNISM	2.40
GOVERNMENT OWNERSHIP OF COAL MINES	2.40
INDUSTRIAL RELATIONS	
Employment Management	2.40
Modern Industrial Movements	2.40
Problems of Labor	2.40
MARRIAGE AND DIVORCE	2.40
MUNICIPAL GOVERNMENT	2.40
NEGRO PROBLEM	2.25
PRISON REFORM	1.25
PROHIBITION: MODIFICATION OF THE VOLSTEAD LAW	2.40
SHORT BALLOT	1.25
SLAVONIC NATIONS OF YESTERDAY AND TODAY	2.40
SOCIAL INSURANCE	2.40
SOCIALISM	1.25
STUDY OF LATIN AND GREEK	1.80
TAXATION	2.25
UNEMPLOYMENT INSURANCE	2.40

THE HANDBOOK SERIES

SELECTED ARTICLES ON

EVOLUTION

Compiled by
EDITH M. PHELPS

NEW YORK
THE H. W. WILSON COMPANY
LONDON: SIR ISAAC PITMAN & SONS, LTD.
1926

Published April, 1926
Printed in the United States of America

PREFACE

One phase of the controversy between the Fundamentalists and the Modernists, which has raged so bitterly in the churches these past few years, is the attack on the teaching of the theory of evolution in the schools and colleges of this country. To those who had accepted the evolutionary theory as a scientific hypothesis, with no disturbance of their religious faith, since to them science and religion were in no wise irreconcilable, but supplemented each other in ministering to human needs, this outburst came as a distinct shock, and as a disagreeable reminiscence of earlier religious conflicts which it had seemed could not possibly be revived again. To the Fundamentalist, however, the matter is a vital one, since to him to accept the evolutionary theory is to overthrow religious belief founded on a literal acceptance of the Bible. The Fundamentalist position has been set forth briefly by Eldred C. Vanderlaan in *Fundamentalism vs. Modernism* as follows:

> For the Fundamentalist the theory of evolution tends to becomes the great enemy. First of all, it contradicts the Bible. It is not merely that it contradicts the first chapter of Genesis; but it is felt to destroy that whole system of doctrine built on the Fall of Adam and Eve, a system which the Fundamentalist holds to be taught throughout the Bible. No fall, no real problem of sin; no sin, no need of salvation; no salvation, no divine Redeemer; and so no Christianity. The doctrine of the animal ancestry of man is held to be degrading, to make man not truly a child of God. If sin is only the remains of the ape and tiger in us, it seems less serious, certainly less guilty. So with might and main the Fundamentalist bestirs himself to show that evolution is unproved.

The Modernist position is perhaps best illustrated in the statement issued while the Presbyterian General Assembly and the Convention of Northern Baptists were in session in May, 1923, when the theological controversy reached an acute stage. It was signed by many eminent scientists and by the religious leaders of several denominations. For the list of signatures see the *Review of Reviews* for July, 1923 (page 89), also *Fundamentalism vs. Modernism,* by Vanderlaan. (page 295).

> We, the undersigned, deeply regret that in recent controversies there has been a tendency to present science and religion as irreconcilable and antagonistic domains of thought, for in fact, they meet distinct human needs, and in the rounding out of human life they supplement rather than displace or oppose each other.
>
> *The purpose of science is to develop, without prejudice or preconception of any kind, a knowledge of the facts, the laws, and the processes of nature. The even more important task of religion, on the other hand, is to develop the consciences, the ideals, and aspirations of mankind.* Each of these two activities represents a deep and vital function of the soul of man, and both are necessary for the life, the progress, and the happiness of the human race.
>
> It is a sublime conception of God which is furnished by science, and one wholly consonant with the highest ideals of religion, when it represents Him as revealing Himself through countless ages in the development of the earth as an abode for man and the age-long inbreathing of life into its constitutent matter, culminating in man with his spiritual nature and all his God-like powers.

A description of the theory of evolution and the history of its gradual development has been left for the Introductory section of this book. To state briefly how it came to be generally accepted may be useful here. The germ of the evolution idea had been in the minds of men since the days of the ancient Greeks. Prior to Darwin's time, researches had been carried on, and important work had been done, the results of which were known, for the most part, only to the few, and of which knowledge was often suppressed. "But," says Samuel Schmucker, in *Man's Life on Earth* "no such silencing of men was possible when Darwin's paper and Wallace's were read on the same night at a meeting of the Linnaean Society. By one of the most remarkable coincidences in the history of thought, both men asserted the same idea of evolution, and both suggested the same explanation of how such a result had been brought about."

Darwin's work had been the more carefully done, as the result of years of patient investigation, and Wallace willingly yielded to him the credit for the idea. The acceptance of Darwin's theory was greatly facilitated by the publication, the following year, of his *Origin of Species,* destined to be most influential in men's lives for many years, and by the increasing ease of communication through the press.

That the new theory met with serious opposition from the religious world of its time is a commonplace to anyone at all familiar with the story of Darwin's discoveries. There were not many independent scientists at that time, scientific studies being pursued mainly by clergymen and physicians in their leisure moments. There had been up to that time comparatively little critical study of the Bible, and the theory seemed to most religious men a direct blow at religious faith. Gradually, however, the new theory gained acceptance among clergymen, especially those trained in scientific thought, who then found ways of reconciling it with religious faith. Little by little the religious opposition died down, and on the death of Darwin, the Church so far accepted him and his work as to offer for his remains, a resting-place in Westminster Abbey.

"Meanwhile," to quote Schmucker again, "the evolution idea was spreading to the other sciences. Men found it a fertile principle, almost wherever they applied it. It began to dominate the treatment of nearly every type of study. The idea that to understand anything, the most satisfactory foundation is to know how it came to be what it is, began to underlie the treatment of psychology, biology, history of economics, of astronomy, of physics, and of chemistry.

"To attempt to exclude from our institutions of learning all that owed its spirit to Darwin's idea would be to wipe out the great bulk of modern scientific literature."

For so long had there been the absence of at least open opposition, that the revival of it seemed at first preposterous. It was difficult to believe that there could be any considerable number of people so apparently unaware of the general trend of scientific discoveries of these latter days. That the number is considerable, and dominates in influence in some sections of this country, is no longer doubted.

Reasons given for the awakening of opposition at this time are various. That it should have happened in this country, of all countries, is ascribed by a leading Fundamentalist to the higher level of general intelligence that exists here, causing the overthrow of opinions sought to be superimposed upon the mass of the people by a few biased irreligious scientists. Others, including English scientists, ascribe it to a generally prevailing ignorance of modern scientific thought and discoveries, coupled with popular control of education. There are probably more people in European countries, in proportion to the population, ignorant of scientific theories, than here, but they are not influential in determining educational policies.

Of the immediate causes for the present revival of opposition, the chief one is the Fundamentalist movement. This took its rise during the World War, when a group of conservative-minded leaders, in several denominations and on both sides of the Atlantic, issued a manifesto declaring prevalent what they considered to be radical departures from the foundation principles of Christian faith. This has proved to be a formidable movement which has threatened the fellowship and unity of several leading denominations, particularly the Presbyterians and Baptists. Its program is to maintain and defend particularly, a miraculously-inspired Bible, authoritative thruout, the miraculous Virgin Birth, a substitutionary atonement, the bodily resurrection of Jesus, and his second coming. In defense of these doctrines they oppose especially the critical study of the Bible, and scientific teachings that tend in any way to discredit the Bible as final authority. Most of this program is confined to the churches, but as part of it, they oppose the teaching of evolution in schools, saying that it tends to undermine the faith of their children, and that, as taxpayers, they have the right to say what should be taught in the schools their children attend.

Opposed to this view, the majority of those grounded in scientific doctrine hold sacred the right to free and untrammeled search for truth, and find acceptance of the evolutionary theory in no wise upsets faith nor discredits God, but, instead, adds to His dignity and glory.

As is brought out in Part II of this book, another event which added fuel to the flame at this time was a speech made at the Toronto meeting, in 1922, of the American Association for the Advancement of Science, by the late Dr. William Bateson of the Innes Horticultural Institute of England, who was eminent in the field of Genetics. In this speech, while he declared his belief in the theory of evolution unshaken, he also declared as unsatisfactory that part of Darwin's theory which explains the method of evolution, and recommended to his fellow scientists further study and research along these lines.

The final paragraph of that speech follows:

> I have put before you very frankly the considerations which have made us agnostic as to the actual mode and processes of evolution. When such confessions are made the enemies of science see their chance. If we cannot declare here and now how species arose, they will obligingly offer us the solutions with which obscurantism is satisfied. Let us then proclaim in precise and unmistakable language that our faith in evolution is unshaken. Every available line of argument converges on this inevitable conclusion. The obscurantist has nothing to suggest which is worth a moment's attention. The difficulties which weigh upon the professional biologist need not trouble the layman. Our doubts are not as to the reality or truth of evolution, but as to the origin of *species*, a technical, almost domestic, problem. Any day that mystery may be solved. The discoveries of the last twenty-five years enable us for the first time to discuss these questions intelligently and on a basis of fact.

That synthesis will follow on analysis, we do not and cannot doubt.

To scientists who had long ago accepted the theory of evolution as laid down by Darwin but also had long ago rejected his account of its method, even as Darwin himself predicted might happen, there was no confusion of ideas. To the man in the street, however, who holds evolution and Darwinism as synonymous, it was tantamount to rejecting the theory of evolution entirely. The papers took it up, and along with others, William J. Bryan helped to spread this mistaken idea in spite of Bateson's later explanation. Bryan's influence in this direction and his support of the entire Fundamentalist movement, which perhaps reached its climax in the fight against evolution, at the Scopes trial in Tennessee, just before his death, served to keep the movement a growing one. Organizations have since been formed to carry on the fight against the teaching of evolution in tax-supported schools, and to suppress or have rewritten text-books containing references to evolution. In addition to the legislation described in the General Discussion of Part II of this book, the Texas State Text-Book Board has ordered all references to evolution to be omitted from books adopted for school use in Texas and a similar law is being considered in Florida. The Governor of Mississippi has recently signed an "Anti-evolution" bill, and efforts to have such legislation enacted are already under way in other states, among them Kentucky and Minnesota.

In preparing this Handbook the aim has been to define as briefly and simply as possible the theory of evolution and to present evidence in its favor and the arguments against it. The following Introduction tells briefly what the theory is and outlines its development, including the theories of Darwin, Lamarck, Mendel, De Vries and Weismann. Part I sets forth in the section, For Evolution, the evidence for the theory as found in the fields of Geology, Paleontology, Comparative anatomy, Embryology, Geographical distribution, Physiology, Psychology and Experimentation. While it is difficult, considering the nature of the subject matter, to make this section entirely logical and easy to read, it will give the reader a view, at least, of the manifold lines of evidence in the various fields. In the section, Against Evolution, are set forth representative views of those opposed to the theory, putting the emphasis, so far as possible, on arguments from the scientific rather than from the religious angle, altho, as the religious view is the fundamental basis for the opposition, this is given representation also.

Part II of the book is devoted to the question of the Teaching of the Theory of Evolution in Schools and Colleges. The General Discussion describes the history of the recent opposition to the theory, especially the legislation of the past few years, culminating in the Scopes trial of which an account is given. Several attempts to explain the rise of the movement are recorded here also. The Affirmative and Negative Discussions represent the views of those opposing and those defending the teaching of the theory.

A bibliography has been included as is customary. To keep it within usable limits, titles have been limited to recent material and a few of the classics. The references have been classified and annotated to aid the reader who wishes to pursue the subject along special lines. In addition to articles dealing particularly with evolution, a few references have been included that will aid the reader in establishing a scientific background. The story of ancient man is also represented by a section of its own.

Much of the controversial literature of this subject reveals an ignorance of how our Bible came to be that is as profound as the ignorance of modern scientific theories. The discovery of the original documents, their translation and interpretation, was the work of human beings, whether or not they were divinely inspired, and sharp differences of opinion have existed among the Church fathers as to the interpretation of, or the admission or exclusion of, certain books from the Canon. For accounts of the Bible, the reader is referred to the *Story of Our Bible and How It Came to Be,* by Harold B. Hunting, (Scribner, $2.50) ; *How the Bible Grew,* by Frank G. Lewis (Univ. of Chicago Press, $1.50) ; *Our English Bible,* by H. W. Hoare (Dutton, $2) ; *The Bible, Its Origin, Its Significance and Its Permanent Value* (Doran, $2.50) ; and *The Bible in the Making,* by John P. Smith (Pott, $1.50), to mention only a few titles. For controversial material on the "inerrancy" of the Bible, readers are directed to *Fundamentalism vs. Modernism,* by Eldred C. Vanderlaan (Handbook Series. Wilson, $2.40) which covers the various points of the Fundamentalist program, including Evolution, by means of selected readings and bibliography for both sides.

The compiler hereby gratefully acknowledges the helpful cooperation of many on both sides of the controversy who were quick to respond to requests for literature and information.

Edith M. Phelps

January 15, 1926

CONTENTS

PAGE
PREFACE v

BIBLIOGRAPHY

Bibliographies xvii
The Scientific Background xviii
Prehistoric Man xix
The Theory of Evolution xxii
Science and Religion xxx
For Evolution xxxiii
Against Evolution xl
The Teaching of Evolution in Schools and Colleges xlviii

INTRODUCTION

Curtis, Winterton C. Doctrine of Evolution ....
..........................School and Society 3
Dundore, Paul J. Present Status of Evolution. ....
...................Reformed Church Review 15

PART I

THE THEORY OF EVOLUTION

FOR EVOLUTION

Rice, William North. "The New Geology" ......
..........................Methodist Review 31
Berry, Edward W. Geologic Evidence of Evolution.
..........................Scientific Monthly 34
Cole, Fay-Cooper. Evolution of Man ....
..........................Scientific Monthly 49

Extinct Races of Ape-Like Man ....Scientific American 51
Davis, Watson. New Light on Evolution ....Current History 61
Newman, H. H. Evidences from Comparative Anatomy ....Scientific Monthly 63
Kellogg, Vernon. What Evolution Stands for Now. ....New York Times 73
Kellogg, Vernon. Variations and Mutations ....Scientific Monthly 81
Metcalf, Maynard, M. Truth of Evolution ....Scientific Monthly 83
Keith, Arthur. Is Darwinism at the Dusk or at the Dawn?. ....Nineteenth Century 85
Thomson, J. Arthur. The Ascent of Man ....Homiletic Review 91
Barnes, E. W. Christian Revelation and Modern Science ....Nature 94

AGAINST EVOLUTION

Hamilton, Floyd E. Evolutionary Hypothesis in the Light of Modern Science. ....Princeton Theological Review 99
Williamson, C. J. Is Man a Creation or an Evolution? 119
Walsh, James J. Comedy of Evolution ....Catholic World 129
Price, George McCready. Modern Botany and the Theory of Organic Evolution ....Princeton Theological Review 137
Bryan, William J. Argument Prepared for the Scopes Trial. ....New York World 146
Clark, David S. Theology and Evolution ....Princeton Theological Review 151

PART II

TEACHING EVOLUTION IN SCHOOLS AND COLLEGES

THE CONTROVERSY

Evolution Forty Years Ago ....Review of Reviews 163
The Scopes Trial 169
Anti-Evolution Legislation in the Various States .. .. Science 173
Evolution and Intellectual Freedom ....Nature 175
Religion and Science in Tennessee ....Round Table 179
Brown, William Adams. Meaning of Fundamentalism ....Nature 185
Nichols, Robert Hastings. The Fundamentalist Movement ....Journal of Religion 188
Dewey, John. Science, Belief and the Public ....New Republic 193

OPPOSED TO THE TEACHING OF EVOLUTION

Price, George McCready. Darwin on Trial: Case Against Evolution ....Review of Reviews (London) 201
Bryan, William J. Evolution Should Not Be Taught ....New York World 208
Miller, J. Wesley. Evolution Today—Its Meaning and Tendency. ......Reformed Church Review 220
Wylie, Richard C. Evolution and Education ....Christian Statesman 222
Keyser, Leander S. Conflict of Fundamentalism and Modernism ....Lutheran Quarterly 227
Williamson, C. J. Is Man a Creation or an Evolution? 230
Excerpts 232

IN FAVOR OF THE TEACHING OF EVOLUTION

Smith, Gerald Birney ...Can Christianity Welcome Freedom of Teaching? ....Journal of Religion 241

Osborn, Henry Fairfield. Proposed Suppression of the Teaching of Evolution. .... Science 255
Patten, William. Why I Teach Evolution .... Scientific Monthly 257
Metcalf, Maynard M. Truth of Evolution .... Scientific Monthly 262
Faunce, William H. P. Freedom in School and Church. .... World's Work 264
Excerpts 270

BIBLIOGRAPHY

The articles starred (*) are reprinted, entire or in part, in this volume.

Bibliographies

Geddes, Patrick and Thomson, J. Arthur. Evolution. (Home Lib. ser.) p. 249-56. 75c. Holt. New York. 1911.

Kellogg, Vernon. Biology (Reading with a Purpose ser.) 40p. pa. 35c. Am. Library Assoc. Chicago. 1925.

A brief introduction to the study of biology. Recommends a short list of books to be read consecutively.

Newman, Horatio Hackett. Readings in evolution, genetics and eugenics. p. 510-12. Univ. of Chicago Press. 1921.

A list of fifty books from which excerpts were quoted in this volume.

Outline on evolution and heredity. Radio pub. No. 7. p. 9-12. pa. 15c. Univ. of Pittsburgh. 1924.

Outline of a series of radio talks on evolution, with bibliography. The talks themselves have been printed as Radio pub. No. 8. price 60c.

Popular books in science: a reading list. rev. ed. 20p. pa. Am. Library Assoc. Chicago. 1925.

A usable list of books for the average reader who wishes to become acquainted with the general field of scientific knowledge. Classified and annotated.

Tyler, John M. Coming of man. p. 136-42. Marshall Jones Co. Boston. 1923.

Vanderlaan, Eldred C. Fundamentalism versus modernism. (Handbook ser.) p. xxiv-xxvii, xxxiii-xxxiv. bibl. $2.40. H. W. Wilson Co. New York. 1925.

Book Review. (Issued by R. R. Bowker Co., 62 W. 45th St., New York). p. 10. S. '25. Fifty books in science for everyman.

While not bearing directly on evolution, these books will help the reader to an understanding of the universe in the light of scientific discoveries that have been made.

Christian Century. 41:462-3. Ap. 10, '24. Science and religion: bibl. Lynn Harold Hough.

Cleveland Open Shelf. No. 7-8:69-72. Jl.-Ag. '25. This evolution business: bibl.

Literary Review. 3:869. Jl. 28, '23. Religion and science: list of books. May Lamberton Becker.

Outlook. 140:469-72. Jl. 29, '25. Evolution: bibl. A. G. Ingalls.

The Scientific Background

Atwood, William H. Civic and economic biology. $1.68. Blakiston. 1922.

Altho this is a high school text, it is clearly written and well-illustrated, and helpful to the beginner.

Chamberlin, Thomas C. Origin of the earth. (Science ser.) $2. Univ. of Chicago Press. 1916.

On the formation of the planets.

Gruenberg, Benjamin Charles. Biology and human life. $1.72. Ginn. Boston. 1925.

Based on his earlier "Elementary biology," it presents the subject simply and attractively. Part I deals with the scope of biology, including the evolutionary development of animal and plant life.

Locy, William A. Biology and its makers. 3d ed. Holt. New York. 1915.

A non-technical account of the rise and progress of biology, centered around the lives of the great leaders.

Scott, George G. Science of biology. 617p. $3.50. Crowell. New York. 1925.

A college text-book, suitable for those who care to make a serious study of biology as a better preparation for comprehension of the issues involved in organic evolution. Requires no previous training in science.

Sedgwick, William T. and Tyler, Harry W. Short history of science. $2.50. Macmillan. New York. 1917.

Addressed to the student and the general reader, this book goes back to the origin of scientific knowledge, and traces the development of the sciences to the present time.

Shipley, Arthur Everett. Life. $2.50. Macmillan. New York. 1924.

"A small, popular, entertaining, well-illustrated and attractive introductory book on biology."—*Outlook.*

Thomson, John Arthur. Everyday biology. $1.25. Doran. New York. 1924.

A simple introduction to the biological ways of thinking, based on consideration of matters of everyday experience.

Thomson, John Arthur. Outline of science. 4vols. Putnam. New York. 1922.

Gives the essentials of present day science in "a plain story simply told." Well illustrated.

Thomson, John Arthur. Science, old and new. $3.50. Putnam. New York. 1924.

Professor Thomson selects a number of interesting topics in biology and discusses them in the light of recent advances in the scientific field.

Thomson, John Arthur. Wonder of life. $3.50. Holt. New York. 1914.

An unconventional introduction to natural history and biology.

Wiggam, Albert Edward. Fruit of the family tree. Bobbs-Merrill. Chicago. 1924.

"Does as much as any one book can do to make the knowledge [of heredity or eugenics] available to the general reader."

PREHISTORIC MAN

BOOKS AND PAMPHLETS

Boyle, Mary E. Man before history. $1.50. Little. New York. 1924.

A short account of prehistoric times. Illustrated.

Burkitt, Miles C. Our forerunners. (Home Univ. Lib.) Holt. New York. 1924.

A simple, clear account of prehistoric man and his culture. Illustrated.

Clodd, Edward. Childhood of the world. new ed. 75c. Macmillan. New York. 1922.

Short, popular and well illustrated.

Keane, Augustus Henry. Man, past and present. rev. and largely rewritten by A. Hingston Quiggin and A. C. Haddon. $12. Macmillan. New York. 1921.

On the races of man.

Lowie, Robert Harry. Primitive society. $3. Boni and Liveright. New York. 1920.

A study of social questions, such as property, association, marriage, government and justice, in the light of their history in primitive society.

McCurdy, George Grant. Human origins. 2vols. $10. Appleton. New York. 1924.

Comprehensive and well illustrated. Vol. I covers the Old stone age; Vol. II, the New stone, Bronze and Iron ages.

Morgan, Jacques J. M. de. Prehistoric man (History of Civilization ser.) $5. Knopf. New York. 1925.

A readable, well illustrated treatment of the industrial development of prehistoric peoples. Written by a French archaeologist.

Osborn, Henry Fairfield. Men of the old stone age. 3d ed. $5. Scribner. New York. 1918.

A semi-popular description of the environment, life and art of the cave men of southwestern Europe. Illustrated.

Quennell, Marjorie. Everyday life in the new stone, bronze and early iron ages. $2.50. Putnam. New York. 1923.

Covers a period of about four thousand years divided under three heads: The new stone age, The bronze age, The early iron age.

Quennell, Marjorie. Everyday life in the old stone age. $2.50. Putnam. New York. 1922.

Reconstructs the life, appearance, occupations, beliefs and art of prehistoric man. Elementary.

Schmucker, Samuel Christian. Man's life on earth. 299p. $2.25. Macmillan. New York. 1925.

"In a simple style, well adapted to the beginner, Dr. Schmucker tells the story of man's origin and development as read in the records of the rocks and caves and his own body, with a final chapter on the religious difficulty."—*Cleveland Open Shelf.*

PERIODICALS

Asia. 24:427-31. Je. '24. Where did man originate? Henry Fairfield Osborn.

Describes some of the fossil remains of earlier man, and lays stress on the further evolution of man.

Atlantic Monthly. 129:454-65. Ap. '22. Fossil man of Rhodesia. G. Elliot Smith.

A general review of the discoveries of fossil human remains, and their bearing on man's origin.

Canadian Magazine. 59:89-95. Je. '22. Our present knowledge of man's ancestry. John Cameron.

Presents simply the evidence for man's origin as it exists at present—Java, Heidelberg, Piltdown, Neanderthal, Cro-Magnon.

*Current History Magazine, N.Y. Times. 22:93-5. Ap. '25. New light on evolution. Watson Davis.

Describes the discovery of *Australopithecus africanus,* a new link in the evidence as to the origin of man.

Current Opinion. 77:484-6. O. '24. Fresh evidence of our apish ancestry: mongol, negro and white trace their descent from three apes.

Discusses in brief, Dr. F. G. Crookshank's findings regarding the origin of the human race. He asserts there are three origins corresponding to the three great anthropoid apes, the orang-utan, the gorilla, and the chimpanzee.

Forum. 73:796-803. Je. '25. Earth speaks to Bryan. Henry Fairfield Osborn.

Describes some of the latest evidence as to the origin of the human race.

The *Hesperopithecus* in Nebraska.

Remains of Aurignacian man in Solutré, France, and Northern China and Southern Mongolia.

Science. 55:129-30. F. 3, '25. Rodesian skull.

A description of the new find in Rhodesia which would seem in the opinion of some to point to the conclusion that this is the missing link.

*Scientific American. 128:302-3+. My. '23. Extinct races of ape-like man.

Traces the evolution of man and apes from a common ancestor. Illustrated.

*Scientific Monthly. 15:97-118. Ag. '22. Geologic evidence of evolution. Edwin W. Berry.

An account of fossil remains and how the geologic evidence as to the fact of evolution was built up from them.

Scientific Monthly. 21:13-19. Jl. '25. Origin of man. Arthur Smith Woodward.

Describes briefly the various evidences of primitive man from *Pithecanthropus* to the Neanderthal man.

Other articles in periodicals dealing with Prehistoric man can be found by referring to the Readers' Guide to Periodical Literature and the International Index to Periodicals.

THE THEORY OF EVOLUTION

BOOKS AND PAMPHLETS

Baitsell, George Alfred, ed. Evolution of man. $3. Yale Univ. Press. 1922.

Lectures delivered at Yale University on various aspects of the evolution of man by Richard Swann Lull, Harry Burr Ferris, George Howard Parker, James Rowland Angell, Albert G. Keller, Edwin Grant Conklin.

Bateson, William. Mendel's principles of heredity. $3.50. Putnam. New York. 1913.

An important statement of what has been achieved by the experimental study of genetics.

Conklin, Edwin G. Direction of human evolution. new ed. $2.50. Scribner. New York. 1922.

Taking as granted that evolution in the widest sense is accepted by scientists, the author considers the course of past evolution only insofar as it bears upon the present and applies its principles to the future evolution of the human race, especially along social lines.

Coulter, John M. Evolution, heredity and eugenics. (School Science ser.) 2d ed. 134p. 75c. John G. Coulter, pub. Bloomington, Ill. 1925.

A simple and compact treatment of organic evolution. Intended to be supplementary to elementary biological texts. Illustrated.

Crampton, Henry E. Doctrine of evolution. $2. Columbia Univ. Press. 1924.

A general introduction to the theory of evolution for the educated reader.

Curtis, Winterton C. Science and human affairs from the viewpoint of biology. $3.50. Harcourt, Brace & Co. New York. 1922.

The author's purpose is to set forth the humanistic and spiritual aspects of science rather than the material transformation and the conquests of physical nature that have resulted in modern civilization. The book is most satisfactory in its understanding of heredity.

Darwin, Charles. Descent of man and selection in relation to sex. 1st ed. pub. in 1871. new ed. Appleton. 1901.

Darwin presents his theory of the descent of man from apelike animals.

Darwin, Charles. Origin of species by means of natural selection. 1st ed. pub. in 1859. 6th ed. Appleton. 1893.

Darwin explained here the theory of evolution by natural selection which was destined to have such an influence on the scientific world.

Encyclopaedia Britannica. 11th ed. Vol. X. Article on Evolution.

Good for history of the development of the theory. Rather technical.

Fenton, Carroll Lane. A history of evolution. (Little Blue Book No. 321.) 64p. pa. 5c. Haldeman-Julius Co. Girard, Kansas. 1922.

A convenient readable account of the most important stages in the history of the development of the evolution theory, with "a slight glimpse of the major characters who made it possible."

Fifty years of Darwinism: modern aspects of evolution. Holt. New York. 1909.

A series of lectures on Darwinism, given as centennial addresses in honor of Charles Darwin, before the American Association for the Advancement of Science.

Galton, Francis. Natural inheritance. 1st ed. Macmillan. 1889.

A classic, applying statistical methods to the study of inheritance.

Geddes, Patrick and Thomson, J. Arthur. Evolution. (Home Univ. Lib.) xiv,256p. 75c. Holt. New York. 1911.

A general introduction to the subject. With bibliography.

Goodrich, Edwin Stephen. Living organisms: an account of their origin and evolution. 200p. $2. Oxford Univ. Press. 1925.

A condensed, though rather difficult, account of modern biology and the facts and theories of evolution. The author has given a clear account of the present state of knowledge of heredity and allied problems.

Herbert, Solomon. First principles of evolution. rev. ed. $2. Macmillan. New York. 1915.

A readable account of evolution, from the cosmic beginnings of the earth to social evolution.

Jeans, James H., and others. Evolution in the light of modern knowledge. xvi,528p. 21s. Blackie & Son, Ltd. London. 1925.

Chapters have been contributed by a number of scientists covering Cosmology, Evolution of the earth as a planet, Geology, Biology, Botany, Zoology, Physiology, Anthropology, Mental evolution, Physics and chemistry, Time and space philosophy, The religious effect of the idea of evolution.

Jordan, David Starr and Kellogg, Vernon L. Evolution and animal life. $4. Appleton. New York. 1907.

A readable discussion of the facts, theories and processes relating to organic evolution. Not too technical for the average reader.

Kellogg, Vernon L. Darwinism to-day. $2. Holt. New York. 1907.

A summary of investigations to date in organic evolution, showing the standing at that time of Darwinism in biological science. Altho not new, it is recommended as useful to the non-scientific reader.

Kellogg, Vernon L. Evolution: the way of man. $1.75. Appleton. 1924.

A short popular account of the scientific facts that are the basis of the evolutionary theory.

Lull, Richard Swann, ed. Evolution of the earth and its inhabitants. $3. Yale Univ. Press. 1918.

Lectures delivered at Yale University: Origin of the earth. Joseph Barrell; Earth's changing surface and climate. Charles Schuchert; Origin of life. Lorande L. Woodruff; Pulse of life. Richard S. Lull; Climate and evolution of civilization. Ellsworth Huntington.

Lull, Richard Swann. Organic evolution. $3. Macmillan. New York. 1917.

One of the most satisfactory texts on this subject. While not overly popular in style, it will appeal to others than students of science.

Lull, Richard Swann. Ways of life. 365p. $3. Harper. New York. 1925.

A clear restatement of the evidences for evolution by the professor of paleontology of Yale University. The final chapter is an historical account of the development of the science of evolution. Stated in non-technical language for the lay reader. Illustrated.

McCabe, Joseph. A B C of evolution. $1.50. Putnam. New York. 1921.

An elementary account, for the beginner, of organic evolution.

McCabe, Joseph vs. Price, George McCready. Is evolution true: debate. Watts & Co., Johnson's Court, Fleet St. London, E.C.4.

Report of debate held in Queen's Hall, London, September 6, 1925.

Morgan, Thomas H. A critique of the theory of evolution. $1.50. Princeton Univ. Press. 1916.

Examines the evidences for evolution, the older evidence and that from heredity, and sets forth his theory of natural selection.

New International Encyclopedia. 2d ed. Vol. VIII. 1915. Article on evolution.

Written in non-technical language. Supplemented by a bibliography.

Newman, Horatio Hackett. Readings in evolution, genetics and eugenics. $3.75. Univ. of Chicago Press. Chicago. 1921.

Excerpts have been chosen from numerous writers on the subject to cover the history of the evolutionary theory and evidences for it. Prepared especially for college students but adapted also to the general reader.

Osborn, Henry Fairfield. From the Greeks to Darwin. $2.75. Scribner. New York. 1923.

An outline of the development of the idea of evolution.

Osborn, Henry Fairfield. Origin and evolution of life; on the theory of action, reaction and interaction of energy. $3. Scribner. New York. 1917.

Advances the energy concept of organic evolution. Helpful to the non-scientific reader.

Osborn, Lucretia T. Chain of life. $2. Scribner. New York. 1925.

A thoroly popular account of evolution by the wife of Henry Fairfield Osborn, based on his writings.

Parker, George Howard. What evolution is. $1.50. Harvard Univ. Press. 1925.

States the main facts of evolution and describes some of the chief theories that have been advanced to account for them. By a Professor of Zoology at Harvard University.

Punnett, Reginald C. Mendelism. 5th ed. $2.75. Macmillan. New York. 1919.

A careful exposition of this subject by an expert.

Romanes, George John. Darwin and after Darwin. 3vol. $4. Open Court. 1892-7.

Vol. I. ($2) is an exposition of the Darwinian theory. Useful to the non-scientific reader.

San Francisco debates on evolution: Maynard Shipley *vs.* Francis D. Nichol and Alonzo L. Baker. 176p. pa. $1. Pacific Press Pub. Assn. Mountain View, Calif. 1925.

Two debates are reported: "Resolved, That the earth and all life upon it are the result of evolution," Maynard Shipley *vs.* Francis D. Nichol; and "Resolved, That the teaching of evolution should be debarred from tax-supported schools," Alonzo L. Baker *vs.* Maynard Shipley.

Schmucker, Samuel C. Meaning of evolution. $2.25. Macmillan. 1913. *Same.* (Macmillan's Standard Lib.) 75c. Macmillan. 1915.

An elementary presentation of the development of the evolutionary theory, "One of the best books for the beginner."—*Cleveland Open Shelf.*

Scott, William B. Theory of evolution. $1. Macmillan. New York. 1917.

The book sets forth especially the evidence upon which the theory of evolution is founded, from comparative anatomy, embryology, paleontology, geographical distribution and experiment.

Straton, John Roach *vs.* Potter, Charles Francis. Evolution versus creation: debate. 110p. pa. Doran. New York. 1924.

Report of debate on the subject "The earth and man came by evolution," held in Carnegie Hall, January 28, 1924. This was the second of a series of five "Fundamentalist-modernist" debates.

Tyler, John M. Coming of man. $2. Marshall Jones Co. Boston. 1923.

Traces the rise and progress of life to its present culmination in our existing civilization.

Vries, Hugo de. Mutation theory. 2vols. Open Court. 1909-10.

The author states some conclusions arrived at in experiments with plants.

Wallace, Alfred R. Contributions to the theory of natural selection. Macmillan. New York. 1871.

A classic.

Wallace, Alfred D. Darwinism. Macmillan. 1889.

A standard book of great interest. It shows how the author's position varies from Darwin's.

Ward, Henshaw. Evolution for John Doe. $3.50. Bobbs-Merrill. Indianapolis. 1925.

A general view of what is meant by organic evolution, such as a person unacquainted with biology needs for an introduction to some of the larger problems of life.

Watson, J. A. S. Evolution. ("Through the Eye" ser.) Stokes. New York. 1915.

Simple, well-illustrated account of the evidence for evolution.

Weismann, August. Evolution theory. 2vols. Longmans. New York. 1904.

Presents the author's own views with respect to the theory of heredity.

PERIODICALS

Atlantic Monthly. 134:662-8. N. '24. Doctrine or theory, which? Clifford H. Farr.

Describes the origin, among primitive peoples of the various theories of evolution and special creation.

Current History Magazine, N.Y. Times. 23:335-9. D. '25. A Roman Catholic view of evolution. Bertram Windle.

Contends that the Catholic Church is by no means opposed to the advancement of science, and that there is no universally accepted Catholic view on evolution.

Current Opinion. 72:644-8. My. '22. Can we still believe in evolution?

Sets forth, by means of excerpts, the contentions of Professors Osborn and Conklin for, and William J. Bryan and Alfred W. McCann against, evolution.

Harper's Magazine. 145:68-74. Je. '22. Is Dadwinism dead? James Harvey Robinson.

Gives a simple account of the evidences for evolution so far produced, and shows that it is Darwin's theory of acquired characteristics that has been abandoned and not evolution itself.

Harper's Magazine. 151:347-54. Ag. '25. Inventive germ-cells. Henshaw Ward.

The argument for evolution from heredity—describes cell-growth and the part of the chromosomes in variation.

Living Age. 324:612-14. Mr. 14, '25. What does Darwinism amount to? J. B. S. Haldane.

Contends that the geological record and the facts of comparative anatomy and embyrology render it fairly certain that evolution has occurred, but tells us nothing as to its causes. Many accept the hypothesis that evolution has been due solely to fortuitous variation and the action of selection on its results.

*Methodist Review. 107:556-62. Jl. '24. New geology, by G. M. Price. Review. W. N. Rice.

While criticising Professor Price's book, this article sets forth the accepted basis of geological truth in simple language.

Nature. 114:539-42. O. 11, '24. Geology and evolution. W. W. Watts.

Shows how successive discoveries in the field of geology all uniformly uphold the theory of evolution. Rather technical.

Nature. 114:899-901. D. 20, '24. Neanderthal man and Grimaldi man: their role in the evolution of mankind.

The author's conclusions are that primitive man was akin to the apes and has not become extinct but has evolved in accordance with environment.

New Republic. 34:179-81. Ap. 11, '23. Where evolution stands today. Vernon Kellogg.

Says that biologists are agreed on the fact of evolution but are yet in doubt as to the causes. Explains briefly the Lamarckian, Darwinian and Mendelian theories as to causes.

Nineteenth Century. 94:401-12. S. '23. Method of evolution. G. Archdall Reid.

While natural selection has been discredited by many biologists as the method of evolution, yet it is more likely than any other, and no other method has yet replaced it.

Science, n.s. 61: sup. 10-12. Je. 19, '25. Origin of the vertebrates.

Describes Professor William Patten's proposed trip to Spitzenbergen in the hope of finding the "missing link" between vertebrates and invertebrates. This is the real missing link for the biologist.

Scientific American. 133:234-5. O. '25. Evolution from the nebula to 1925. Albert G. Ingalls.

Illustrated with a full page chart and accompanied by a short reading list.

*Scientific Monthly. 19:635-47. D. '24. Why I teach evolution. William Patten.

A short review of the entire subject of evolution. Contends that there is no real antagonism between religion and science.

Scientific Monthly. 21:122-34. Ag. '25. Life, heredity and evolution. William Patten.

The story of creative progress told in unscientific and simple language.

*School and Society. 17:393-405. Ap. 14, '23. Current aspects of the doctrine of organic evolution. W. C. Curtis.

A plain account of evolution in its cosmic, geologic and organic aspects. With list of books on evolution. *See* abstract in Scientific American. 129:252. O. '23.

World's Work. 48:90-3. My. '24. Evolution: what is it? Vernon Kellogg.

Tells simply what evolution is and why there is nothing that should disturb anyone in its real relation to religion.

Yale Review. n.s. 11:340-52. Ja. '22. Road of evolution. Albert P. Mathews.

"Evolution is the spirit trying to throw off the trammels of matter."

Yale Review. n.s. 12:305-13. Ja. '23. Science and the soul. Vernon Kellogg.

A scientist's views regarding the nature and origin of the soul.

SCIENCE AND RELIGION

BOOKS AND PAMPHLETS

Abbott, Lyman. Theology of an evolutionist. Houghton Mifflin. 1898.

"A frank attempt to deal with religious ideals in the light of generally accepted scientific doctrine."—*Gerald Birney Smith.*

American Institute of Sacred Literature, Univ. of Chicago, Chicago, Ill. Popular religious leaflets. 3c. each.

Conklin, Edwin G. Evolution and the Bible.
Matthews, Shailer. How science helps our faith.
Millikan, Robert A. A scientist confesses his faith.
Frost, Edwin B. The heavens are telling.
Abbott, Lyman. Creation by evolution.
Abbott, Lyman. The evolutionist believes
Joint statement upon the relations of science and religion.

American Institute of Sacred Literature, Reading course on "Evolution and the Christian faith." Chicago, Ill.

For details apply to the Institute, Univ. of Chicago, Chicago, Ill.

Coulter, J. M. and Coulter, M. C. Where evolution and religion meet. $1.25. Macmillan. New York. 1924.

Two well-known botanists affirm that there is no incompatibility between evolution and religion.

Dawson, Marshall. Nineteenth century evolution and after. $1.50. Macmillan. New York. 1923.

A study of personal forces affecting the social process, in the light of the life-sciences and religion.

Drummond, Henry. Ascent of man. $1. James Pott & Co. New York. 1894.

Maintains that the altruistic principle is coeval with the struggle for life. Holds evolution is not inconsistent with Christianity.

Ellwood, Charles Abram. Reconstruction of religion. $2.25. Macmillan. New York. 1922.

The author, Professor of Sociology in the University of Missouri, believes the crisis in the religious world to have been brought about by the failure of religion to adapt itself to the two outstanding facts in our civilization—science and democracy. His purpose is to show how the social sciences may help religion to build a better world.

Hardwick, John Charlton. Religion and science from Galileo to Bergson. Macmillan. New York. 1920.

Le Conte, Joseph. Evolution and its relation to religious thought. 2d ed. Appleton. 1897.

"The essentials of religious faith [science] does not, cannot touch, but it purifies and ennobles our conceptions of Deity, and thus elevates the whole plane of religious thought."—*Author.*

Lodge, Oliver. Making of man: a study in evolution. $2. Doran. New York. 1924.

The arguments of the book are (1) That evolution is a reality, and (2) That mankind as yet is in an early stage of evolution.

Lodge, Oliver. Man and the universe. Doran. New York. 1920.

Parts I on Science and faith and IV on Science and Christianity deals of the relation between science and religion.

McCosh, James. Religious aspect of evolution. Putman's. New York. 1888.

Contends that evolution, rightly understood, is not in conflict with the Bible.

Millikan, Robert Andrews. Science and life. $1. Pilgrim Press. Boston. 1924.

Four addresses given on different occasions dealing with the bearing of science on human welfare. One of them, *Science and religion,* was published in Christian Century for June 21, 1923, p. 778-83 and has been reprinted as a tract by the American Institute of Sacred Literature.

Quick, Oliver Chase. Liberalism, modernism and tradition. $2.50. Longmans. New York. 1922.

The canon of Newcastle tries to find a way of reconciliation between modern and traditional modes of thought, and a basis for a truly Christian belief about Christ.

Unwin, Ernest E. Religion and biology. $1.75. Doran. New York. 1923.

He traces in brief popular style the outstanding factors in the evolutionary process, and then seeks to ground religious faith squarely on the evolutionary view.

Vanderlaan, Eldred C. Fundamentalism versus modernism. (Handbook ser.) $2.40. H. W. Wilson Co. New York. 1925.

Part III, Science and Religion, contains reprints of a number of articles on both sides of the question of evolution versus the Bible.

White, Andrew D. A history of the warfare of science with theology in Christendom. 2vols. $5. Appleton. 1896.

The author emphasizes the point that in his opinion the struggle is between science and theology, not between science and religion. Describes the development of opinion.

PERIODICALS

Catholic World. 116:684-7. F. '23. Place of religion in modern scientific civilization; address by Charles P. Steinmetz. Review.

See also abstract in Literary Digest. 75:32-3. N. 25, '22. Steinmetz says religion is not necessarily incompatible with science, but is a "different and unrelated activity of the human mind."

Catholic World. 121:721-8. S. '25. If evolution were a fact? John M. Cooper.

The author contends that science has been more often a help to faith than a hindrance, and that if evolution should turn out to be an established reality, it would add to our conception of the grandeur and glory of God and his divine purpose.

Century. 110:33-41. My. '25. Thomas Henry Huxley. Edward Clodd.

Description of Huxley and of the years of religio-scientific battle following the publication of his *Origin of Species.*

Christian Century. 40:778-83. Je. 21 '23. Scientist confesses his faith. Robert A. Millikan.

Dr. Robert A. Millikan says there is no antagonism between science and religion and that eminent scientists are nearly always deeply religious. A condensation of this article appears in the Literary Digest for July 14, 1923, p. 30.

Collier's. 74:34. D. 13, '24. Why argue about evolution? David Starr Jordan.

Says the truths of the universe have to be found out, not merely thought out.

Collier's. 76:5-6. O. 24, '25. A scientist's God. Robert A. Millikan.

Dr. Millikan gives his answer to the question "Is science opposed to religion?"

Forum. 73:486-94. Ap. '25. Credo of a naturalist. Henry F. Osborn.

"The purpose of science is to develop, without prejudice or preconception of any kind, a knowledge of the facts, the laws, and the processes of nature. The even more important task of religion, on the other hand, is to develop the conscience, the ideals, and the aspirations of mankind. Each of these two activities represents a deep and vital function of the soul of man, and both are necessary for the life, the progress, and the happiness of the human race."—*From a Credo signed by fifteen eminent naturalists.*

*Nature. 106:10-12. S. 2, '20. Christian revelation and modern science. E. W. Barnes.

*New York Times. Section 9:1. Je. '21, '25. Fundamentalism and evolution: both sides. J. G. Machen and Vernon Kellogg.

What fundamentalism stands for now, by J. G. Machen; What evolution stands for now, by Vernon Kellogg; abstracts of these articles appear in the Literary Digest. 86:31-2. Jl. 11, '25.

FOR EVOLUTION

BOOKS AND PAMPHLETS

D'Arcy, Charles F. Science and creation. $1.25. Longmans. New York. 1925.

The Archbishop of Armagh (Ireland) feels that a God who could originate such a process as the evolutionary one is a finer being than the more traditional God.

Fosdick, H. E. and Eddy, Sherwood. Science and religion: evolution and the Bible. 42p. Doran. New York. 1924.

Keen, William W. I believe in God and in evolution. 3d ed. 100p. $1. Lippincott. Philadelphia. 1925.

By a physician who finds his belief in evolution does not conflict with the Bible which is to him the "Book of books," a precious manual of religion but not a text book of science.

Lane, Henry H. Evolution and Christian faith. $2. Princeton Univ. Press. 1923.

The Professor of Zoology at the University of Kansas says that a belief in evolution is compatible with a belief in the teachings of Christianity. The conflict has never been between science and religion but between ignorant tradition and true knowledge.

Osborn, Henry Fairfield. Evolution and religion. 75c. Scribner. New York. 1923.

A reprint, with some modifications, of his statement in the New York Times of March 4, 1922, in answer to William J. Bryan.

Osborn, Henry Fairfield. Earth speaks to Bryan. 91p. $1. Scribner. New York. 1925.

Five articles by the president of Trustees of the American Museum of Natural History on evolution and religion, and on the Tennessee trial. An answer to William J. Bryan.

Thomson, John Arthur. Concerning evolution. $2.50. Yale Univ. Press. New Haven. 1925.

The Dwight H. Terry lectures delivered at Yale University, 1924. The author's object was to show that evolutionist description is not inconsistent with religious interpretation.

Thomson, John Arthur. Science and religion. $2. Scribner. New York. 1925.

"Six lectures, delivered by an eminent British biologist, at Union Theological Seminary, aiming to show that modern biological science is not in conflict with Christian faith."—*Cleveland Open Shelf.*

Wishart, Alfred Wesley. Evolution and religion. 63p. pa. 50c. Fountain St. Baptist Church. Grand Rapids, Mich.

The pastor of the Fountain St. Baptist Church has aimed to show, in these five sermons, "what the theory of evolution is, and that it does not rob us of faith, or undermine fundamental spiritual obligations and ideals."

PERIODICALS

Atlantic Monthly. 133:485-92. Ap. '24. Modern view of evolution. Vernon Kellogg.

A plea for a wider conception of evolution. Claims it is much more than a mere denial of the Biblical explanation of human origin, and does not have all the significance attributed to it by theology.

Atlantic Monthly. 136:200-7. Ag. '25. Religion and science. Alfred North Whitehead.

Tells what real religion is, and why our present-day religion seems to be incompatable with science.

Christian Century. 40:714-17. Je. 7, '23. Creative religion. Elmer E. Snoddy.

The changing concepts of creation and evolution are bringing science and religion together and making it possible for the Christian to accept evolutionary thought.

Christian Century. 40:933-4. Jl. 26 '23. Darwin's doctrine.

Says that Fundamentalists have taken advantage of the controversies among scientists, inevitable in the light of increasing knowledge, to state that the entire doctrine is disproved.

Christian Century. 40:1290-1. O. 11, '23. Science is making religion new. E. W. Barnes.

Contends faith must be reasonable and not blind, that religion today must be combined with that outlook of the world which modern science has constructed.

Contemporary Review. 125:753-61. Je. '24. New reformation. Samuel McComb.

Describes what the new religion, based on our present scientific knowledge, must be if it is to hold the hearts of men.

Forum. 70:1681-97. Jl. '23. Religion, or dogma. Newell Dwight Hillis.

An answer to Bryan's "Fundamentals" in this same number of the Forum.

Forum. 73:169-77. F. '25. Evolution and daily living. Henry Fairfield Osborn.

Contends that belief in evolution demands the highest ideals in conduct, and is by no means incompatible with belief in Christianity.

Harper's Magazine. 148:110-15. D. '23. Changing views of evolution. Ellwood Hendrick.

Describes some recent experiments which tend to reinstate Darwin's theory of inheritance of acquired characteristics.

Hibbert Journal. 21:227-47, Ja. '23. Idea of evolution and the idea of God. G. A. Holmes.

Says evolution is slowly revolutionizing our idea of God, from a stable to a dynamic view.

*Homiletic Review. 87:3-7. Ja. '24. Ascent of man. John Arthur Thomson.

Describes man's place in nature according to science, and the importance of differentiating between the scientific description of man and the religious interpretation of him.

Homiletic Review. 87:94-6. F. '24. Methodist Church and fundamentalism. Francis J. McConnell.

Describes the attitude of Methodism toward science and evolution.

Independent. 114:494-6. My. 2, '25. Uncle Jaspar and Mr. Bryan; fundamentalism and absurdity. Henshaw Ward.

An imaginary talk with Bryan, pointing out that his efforts discredited religion and the church.

*Journal of Religion. 2:245-62. My. '22. Can Christianity welcome freedom of teaching? Gerald Birney Smith.

Sets forth the fundamental weaknesses of the Fundamentalist's position in its insistence on the uncritical acceptance of dogma as against the desire for the truth-seeking spirit to prevail that animates the more liberal Christian element.

Journal of Social Forces. 3:111-17. N. '24. Noose of Darwin and the neck of orthodoxy. Robert W. Winston.

"The secrets of nature do not contradict but rather confirm our consciousness of an in-dwelling spirit and of immortality."

Ladies' Home Journal. 42:12+. S. '25. Evolution and religion. Harry Emerson Fosdick.

A brief review of the evidence for evolution, and a statement of the author's belief that it does not rule out the Bible and religion.

Literary Digest. 86:34. Jl. 4 '25. Catholic view of evolution.

Catholicism is not against the teaching of evolution.

Living Age. 326:607-12. S. 19, '25. Darwinism up to date. Julian Huxley.

A brief survey of evolution, the necessity for the theory, the statement of it by Darwin, as modified by later thinkers, and the consequences of their solutions.

Methodist Quarterly Review. 72:258-87. Ap. '23. Creator's plan of the universe. Austin R. Middleton.

Describes the evolution theory briefly and offers evidence to show it is not contrary to Biblical teachings.

Nature. 109:553-6. Ap. 29, '22. Evolutionary faith and modern doubts. W. Bateson. *Same.* Science. 55:55-61. Ja. 20, '22; *also same* cond. Literary Digest. 72:62. Mr. 25, '22.

This is Professor Bateson's speech at Toronto which Bryan referred to as evidence that the evolutionary theory was discredited among scientists. Professor Bateson's thesis was that the wealth of new discoveries made it impossible to dogmatize as earlier scientists had done, with regard to the origin of species, but declares his faith in evolution unshaken. This paper was discussed in Nature for May 27, p. 669-70, and June 17, p. 775-7.

Nature. 114:468-71. S. 27, '24. Biology and religion. J. S. Haldane.

Discusses the difficulty in reconciling science and religion and says that in reality there is nothing to come between biological science and real religion.

New Republic. 32:300-2. N. 15, '22. Matilda and the chimpanzee. Vernon Kellogg.

Evolution does not destroy religion but justifies it.

New Republic. 34:9-11. F. 28, '23. Naturalism and Christianity. Herbert Croly.

Thinks Christianity will not only survive a thorough-going loyalty to naturalism, but that very loyalty will permit its essential truth to educate its followers to an understanding of God as he really is.

New York Times. Section 7:2. Mr. 5, '22. Reply to Mr. Bryan. Henry Fairfield Osborn.

Declares the evolution of man is firmly established. States the point of view toward evolution of great religious leaders from the time of Augustine to that of Kingsley.

New York Times. Section 7:14. Mr. 5, '22. Reply to Mr. Bryan. E. G. Conklin.

Answers Bryan's contention that evolution is an unproved "guess."

New York Times. Section 7:2, 13. Mr. 12, '22. Reply to Mr. Bryan. Harry Emerson Fosdick.

An answer from the religious standpoint. Reprinted in Fosdick and Eddy, Science and religion.

New York Times. Section 1:1, 23. S. 20, '25. Reply to W. J. Bryan's posthumous statement regarding evolution. Dudley Field Malone.

Report of speech delivered before the convention of layman of the Unitarian Church, Lenox, Mass., September 19, 1925.

*Nineteenth Century. 92:173-82. Ag. '22. Is Darwinism at the dusk or at the dawn? Arthur Keith.

Gives some of the reasons why Darwin's theory of evolution is still sound. Later discoveries have reaffirmed many of Darwin's theories.

Open Court. 37:538-44. S. '23. Emprize supreme; concerning evolution and religious faith. Edward L. Moore.

Contends that evolution tends to confirm, not break down, faith in Divine Will.

Outlook. 130:454-5. Mr. 22 '22. Some religious aspects of evolution. Lyman Abbott.

Defines evolution as he believes it is.

Outlook. 134:115-16. Je. 6, '25. Science and the knowledge of God.

Evolution has "rendered it impossible for any thinking person who really understands the conception underlying evolution to be without reverence and a consciousness of the need of faith."

*Reformed Church Review. 3:1-51. Ja. '24. Present status of evolution and its relation to Christianity. Paul J. Dundore.

A simply written account of the theory of evolution and arguments in its defense.

Science. 55:605-10. Je. 9, '22. Surgical and anatomic evidence of evolution. W. W. Keen.

A surgeon describes the evidence for the origin of man from the similarity of physical structure in man and the animals, as shown in his practice.

Science. 57:630-1. Je. 1, '23. Joint statement upon the relations of science and religion: formulated and signatures secured by Dr. R. A. Millikan of the California Institute of Technology.

The gist of this statement is that science and religion supplement rather than displace or oppose each other. *See also* School and Society. 17:606. Je. 2, '23.

Science Progress. 18:79-96. Jl. '23. Present position of the Darwinian theory. E. W. McBride.

Discusses the Darwinian theory in the light of recent research. States that, in general, the theory is as securely based as it ever was. Rather technical.

Scientific American. 132:333-4. My. '25. Is Mr. Bryan ignorant of evolution?

Professor Rice of Ohio Wesleyan University criticizes Bryan's statements on the ground that they are founded on ignorance of the real facts concerning evolution.

Scientific Monthly. 15:193-214. S. '22. Reasonableness of science. W. M. Davis.

States that the cause of the conflict of science and religion lies not in the trespass of science upon the proper field of religion, but of religion upon the proper field of science.

Scientific Monthly. 17:88-91. Jl. '23. Religion and science. E. E. Slosson.

Science and religion, properly understood, need never conflict—for each supplies what the other lacks.

*Scientific Monthly. 21:135-49, 291-328. Ag.-S. '25. Evidences for evolution.

Statements by Dr. Maynard M. Metcalf, Dr. Winterton C. Curtis, Dr. H. H. Newman, Dr. Jacob G. Lipman, Prof. Wilbur A. Nelson, Dr. Charles H. Judd, Dr. Fay-Cooper Cole, and Dr. Kirtley F. Mather and others, prepared for the defense counsel, State of Tennessee *vs.* John T. Scopes.

School and Society. 20:729-31. D. 6, '24. Move to prevent the teaching of evolution in the public schools of California. William E. Ritter.

Contends that evolution should be taught to further the brotherhood of man.

School and Society. 21:598. My. 16, '25. Dean Inge on science and religion.

Says Bryan does not represent the church officially.

Scribner's Magazine. 75:23-9. Ja. '24. Copernicus and the fundamentalists. Henry S. Pritchett.

Compares the fundamentalists of today with those who assailed the teachings of Copernicus.

Sunset. 52:15. Mr. '24. Evolution and theology. David Starr Jordan.

Says there should be no struggle between them.

*World's Work. 45:509-13. Mr. '23. Freedom in school and church. William H. P. Faunce.

The president of Brown University contends that evolution has been a powerful aid to religion and that those who oppose it are, altho sincere, harming the religious faith of thousands. This article also appears in condensed form in the Literary Digest for Mr. 24, '23. p. 33.

World's Work. 50:391-9. Ag. '25. Religion of the scientist. Albert Edward Wiggam.

A plea for science to give to men its spiritual life as well as its products and implements, in order that men may have the wherewithal to live by.

Against Evolution

Books and Pamphlets

Benson, Lawrence S. Darwinism. (Serial Science Pubs. No. 1.) 25p. pa. Serial Science Society. New York. 1876.

Shows why the arguments of the evolutionists are untenable.

Bohannan, William J. H. Nephilim. R. A. Silk. New York. 1908.

This book is written to show the error of "science" and to point out the truth of the statement of the Bible concerning physical phenomena.

Bryan, William J. In His image. $1.75. Revell. New York. 1922.

A vigorous attack on the higher criticism and the theory of evolution. At the time of his death Mr. Bryan was the leading spokesman for the "Fundamentalists."

Bryan, William J. Last message of William Jennings Bryan: foreword by Mrs. Bryan. $1. Revell. New York. 1925.

A summary of all that Mr. Bryan had gathered in defense of the Scriptures in his fight against evolution, together with some of his personal experiences, leading up to its publication.

Bryan, William J. Menace of Darwinism. 35c. Revell. New York. 1922.

Discourses on the origin of man and the effect of the Darwinian theory upon religious thought.

Bryan, William J. Orthodox Christianity versus modernism. pa. 35c. Revell. New York. 1923.

The second of these addresses deals with evolution.

Conant, Judson E. The church, the schools, and evolution. 90p. Bible Inst. Colportage Assn. Chicago. 1922.

Dawn of humanity. 125p. The Altruist Foundation Co. Inc., Assn. Bldg. Chicago. 1925.

Contents: The menace of Darwinism, and The Bible and its enemies, by William Jennings Bryan; and Evolution disproved, by Lowell Harris Coate.

Fairhurst, Alfred. Organic evolution considered. Standard Pub. Co. Cincinnati. 1913.

The author is Professor of Natural Science in the University of Kentucky. He has given a general statement of the claims for evolution and his objections to those claims.

Gray, James M. Why a Christian cannot be an evolutionist. 14p. pa. 7c. Bible Inst. Colportage Assn. Chicago. 1925.

Defines evolution and Christianity and shows why they are incompatible.

Gridley, Albert L. The first chapter of Genesis as the rock foundation for science and religion. Badger. Boston. 1913.

King, Sterling Price. Science versus evolution. $1. Modern Science Press. St. Louis. 1925.

Discusses evolution in relation to intelligence, natural law, creation, geology, biology, Christianity, etc.

Knight, Charles Spurgeon. Both sides of evolution: a debate. 2d ed. 90c. Arthur H. Field Pub. House. San Jose, Calif. c1925.

McCann, Alfred W. God—or gorilla. $3. Devin-Adair. New York. 1922.

How the monkey theory of evolution exposes its own methods, refutes its own principles, denies its own inferences, and disproves its own case.

Mauro, Philip. Evolution at the bar. 75c. Hamilton Bros., Scripture Truth Depot., 120 Tremont St. Boston. 1922.

Aims to show that evolution is a discredited doctrine, that it has no standing today as a scientific theory, no support whatever in the facts of science, but is opposed by all the pertinent evidence.

McPherson, G. W. Crisis in church and college. p. 84-102. Evolution. pub. by Author, St Andrews Place. Yonkers, N.Y. 1919.

The evolutionary theory, though unproved, is at the root of the tendency to modernism today.

Mead, Willis Waldo. Evolution discredited. 8p. Gospel Union Pub. Co. Kansas City, Mo. 1923.

Milligan, E. M. Science and the Bible. 24p. pa. United Presbyterian Board of Pub. Pittsburgh

By the manager of the United Presbyterian Board of Pub. Cites evidence to show evolution is an unproved theory.

More, Louis T. Dogma of evolution. $3.50. Princeton Univ. Press. 1925.

The Dean of Liberal Arts, University of Cincinnati assails the evolution theory and objects to the tendency to apply a too narrowly scientific rule as a measure of life.

Morton, Harold C. Bankruptcy of evolution. $1. National Bible Institute, 340 West 55th St. New York.

O'Toole, George Barry. Case against evolution. $3.50. Macmillan. New York. 1925.

The author maintains that evolution is as yet merely a hypothesis, not an established fact, and that the agnostic attitude in regard to it is the safest. Rather technical. Has a glossary of the scientific terms employed.

Patterson, Alexander. Other side of evolution: an examination of its evidences. introd. by George F. Wright. $1. Bible Inst. Colportage Assn. Chicago. 1912.

An attempt is made to refute evolution by citations of authority, particularly of the older scientists.

Phelps, Guy Fitch. Absurdities of evolution. $1.25. Bible Inst. Colportage Assn. Chicago. 1924.

Porter, J. W. Evolution a menace. 94p. Sunday School Board, Southern Baptist Convention. Nashville, Tenn. 1922.

Opposed to evolution. His main reliance for material to overthrow evolution is on the books of geology published by Professor George McCready Price.

Price, George McCready. Back to the Bible; or, The new protestantism. rev. ed. Review & Harold Pub. Assn. Washington, D.C. 1920.

A restatement of the fundamental truths of Christianity in the setting demanded by the exigencies of the present situation. See especially Chapter IX and X.

Price, George McCready. Fundamentals of geology. Pacific Press Pub. Assn. Mountain View, Calif. 1913.

Challenges sharply the accepted theories of geology, upon which Darwinism rests.

Price, George McCready. Illogical geology the weakest point in the evolution theory. Adv. ed. 93p. pa. Modern Heretic Co. Los Angeles. 1906.

Price, George McCready. New geology. $3.50. Pacific Press Pub. Assn. Mountain View, Calif. 1923.

Denies the evidence for evolution from the geological side.

Price, George McCready. Phantom of organic evolution. $1.50. Revell. New York. 1924.

His thesis is "Man was created; he has not evolved." His chief argument is from a system of geology of his own, his contention being that the generally accepted scheme of geologic chronology is an artificial absurdity.

Price, George McCready. Predicament of evolution. il. pa. Southern Pub. Assn. Nashville, Tenn. 1925.

Nearly all from the scientific standpoint and supposedly up-to-date.

Price, George McCready. Q.E.D., or New light on the doctrine of creation. Revell. New York. 1917.

The author sets forth the arguments for special creation as against the theory of evolution.

Schultz, Alfred P. End of Darwinism. 20p. pa. Pub. by the author. Monticello, Sullivan Co., New York. 1911.

"Not one *fact* has been discovered which substantiates the theory, and many facts which prove it to be erroneous, not only erroneous but impossible."

Thomas, W. H. Griffith. Evolution and the supernatural. 25c. Sunday School Times Co., 1031 Walnut St. Philadelphia.

Discusses the effects of the acceptance of the theory of evolution on Christian faith and life.

Thomas, W. A. Griffith. What about evolution? 24p. 10c. Bible Inst. Colportage Assn. Chicago. 1918.

In opposition to evolution, based on the authority of the earlier scientists. Reprinted in Vanderlaan, "Fundamentalism versus Modernism."

*Williamson, C. J. Is man a creation or an evolution? 20p. pa. United Presbyterian Board of Pub. Pittsburgh. 1924.

The pastor of the Highland United Presbyterian Church, New Castle, Pa., asserts a man cannot accept the evolutionary theory and remain a Christian.

Wright, George F. Origin and antiquity of man. Bibliotheca Sacra. Co. Oberlin, O. 1912.

Discusses the origin and antiquity of the earth. Questions whether man's pre-eminence was due to evolution or divine intervention. Inclines toward the theory of divine intervention.

PERIODICALS

Baptist Monthly Magazine. 2:30-3, 56-61. Je.-Jl., '25. Scientists and the fallacies of evolution. Arthur Brown.

Cites evidence from a number of authorities against the theory.

See articles by the same author in earlier issues.

Baptist Monthly Magazine. 2:49-52. Ag. '25. Evolution. Arthur Brown.

Quotes from scientists to prove his contention that the war among the scientists does not promise much for the progress of the evolutionary theory.

Biblical Review. 9:371-86. Jl. '24. Evolution and the Fall. William H. Johnson.

Contends that no proved fact of science yet disproves the Fall of man. Discusses the various theories of scientists and others with regard to the place of the Fall in the theory of evolution.

Bibliotheca Sacra. 82:276-98. Jl. '25. Creation versus evolution. Leander S. Keyser.

Compares the doctrine of progressive creation and progressive revelation as taught in the Bible with the doctrine of evolution, to the advantage of the former.

*Catholic World. 116:66-75. O. '22. Comedy of evolution. James J. Walsh.

His contention is that all the suggested factors of evolution have been rejected, one after another, and the theory is left very much in the air.

Catholic World. 119:381-91. Je. '24. Ernst Haeckel. James M. Gillis.

Criticizes the dogmatism of Haeckel and other scientists regarding the truth of evolution.

Catholic World. 119:653-61. Ag. '24. Our poor relations, the monkeys. Albert R. Bandini.

"Evolution would explain everything without God, if, without God, one could explain evolution."

Catholic World. 121:380-3. Je. '25. To believe or not to believe? James M. Gillis.

Says the scientists cannot account for the origin of things by evolution.

*Christian Statesman. 59:24-7. S. '25. Evolution and education.

Rejects the theory of evolution and upholds the Biblical account of creation.

Christian Work. 14:749-51. Je. 16, '23. Conflict between evolution and Christianity. William J. Bryan.

Collier's. 76:8. Ag. 1, '25. Bible is good enough for me. William J. Bryan.

Says one cannot accept Darwinism or evolution without discarding the Bible and rejecting the dominant note of Christianity; viz., regeneration.

Forum. 70:1665-80. Jl. '23. Fundamentals. William J. Bryan.

Says the unproved hypothesis of evolution is the root cause of dissension in churches, of the growing irreligiousness of the young, of the late war, etc.

Forum. 74:101-7. Jl. '25. Mr. Bryan speaks to Darwin. William J. Bryan.

A reply to Professor Osborn's article "The earth speaks to Bryan" in the Forum for June, 1925.

Forum. 75:245-51. F. '25. Fancies of the evolutionists. John Roach Straton.

Dr. Straton thinks the American Museum of Natural History should give space to an exhibit of "The Bible Story of Creation" to be put side by side with the "Hall of the Age of Man" and describes in detail what such an exhibit should be.

Independent. 114:473-4. Ap. 25 '25. Freedom of faith. E. Y. Mullins.

Says you cannot deny the supernatural and keep the Christian religion.

London Quarterly Review. 142:29-39. Jl. '24. New scientific religion; review of Essays of a biologist, by Julian Huxley. C. A. West.

Contends that Huxley's conclusions would undoubtedly undermine the Christian faith, and shows on how flimsy a basis they have been constructed.

*Lutheran Quarterly. 55:294-314. Jl. '25. Conflict of fundamentalism and modernism. Leander S. Keyser.

Among other things this article deals with the theory of evolution as part of the Modernist's creed.

New Statesman. 25:597-8. S. 12, '25. Fundamental ignorance of scientists.

Criticises the tendency of scientists to accept as fundamental dogma what is really an hypothesis.

New York Times. Section 7:1, 11. F. 26, '22. God and evolution. William J. Bryan.

Says "Darwinism" is only an unproved "guess" and that it has a tendency to weaken religious faith. *See* abstract in Science. 55:242-3. Mr. 3, '22.

*New York World. p. 1, 2, 4. Jl. 29, '25. Speech of William J. Bryan.

Text of argument prepared for Scopes trial but undelivered. Released to newspapers by Mrs. Bryan after his death.

Nineteenth Century. 96:626-38. N. '24. Man as a separate creation. James Corbett.

Contends that evolution has never been proved when it comes to man; that man is a separate creation.

*Princeton Theological Review. 22:420-46. Jl. '24. Evolutionary hypothesis in the light of modern science. Floyd E. Hamilton.

Offers what he considers conclusive proof that evolution has never occurred.

*Princeton Theological Review. 23:51-65. Ja. '25. Modern botany and the theory of organic evolution. George McCready Price.

Presents evidence from the field of botany that the theory of evolution is crumbling.

*Princeton Theological Review. 23:193-212. Ap. '25. Theology and evolution. David S. Clark.

The purpose of this discussion is to show how evolution has entered the field of theology, and influenced the discussion of the great theological themes.

*Reformed Church Review. 2:291-308. Jl. '23. Evolution today; its meaning and tendency. J. Wesley Miller.

Traces the unrest of today to disbelief in God and the supernatural, and challenges the doctrines of evolution.

Reformed Church Review. 3:367-403. O. '24. Evolution and pseudo-evolutionism. A. S. Zerbe.

Says evolution is unable to account for the riddles of matter and force, life, personality and self-consciousness.

Scientific Monthly. 21:5-12. Jl. '25. Distribution of animals after the deluge. William Kirby.

Offers reasons to show that a Supreme Power, and not chance or nature, was responsible for the distribution.

Many articles will be found in strictly fundamentalist periodicals, such as:

Baptist Fundamentalist, organ of the Baptist Bible Union, W. B. Riley, editor. First Baptist Church, Minneapolis, Minn.

Baptist Monthly (combined with American Baptist after August, 1925), J. W. Porter, 135 Park Ave., Lexington, Ky.

The Faith (formerly the Fundamentalist, and before that, Religious Searchlight), organ of the Baptist Bible Union of New York, J. Roach Straton, Pres., 123 W. 57th Street, New York City.

Gospel Witness, organ of the Baptist Union, T. T. Shields, editor, 72 Lowther Ave., Toronto, Ont.

Moody Bible Institute Monthly, 150 Institute Place, Chicago.

Presbyterian, 1217 Market Street, Philadelphia.

Watchmen Examiner, 23 East 26th Street, New York City.

Institutions and publishing houses issuing fundamentalist literature are:

Bible Institute Colportage Association, 826 No. La Salle St., Chicago.

Gospel Union Pub. Co., 1841 E. 7th St., Kansas City, Mo.

Moody Bible Institute, 150 Institute Place, Chicago, Ill.

National Anti-Evolution Society, 604 Olive St., St. Louis, Mo.

Membership includes textbook *Science vs. Evolution,* subscription to the *Anti-Evolutionist,* correspondence course, etc.

THE TEACHING OF EVOLUTION IN SCHOOLS AND COLLEGES

BOOKS AND PAMPHLETS

Allan, Leslie H. Bryan and Darrow at Dayton. $1.50. A Lee & Co., 20 W. 34th St. New York. 1925.

The full and authentic account of the Scopes trial, at Dayton, Tenn.

Fairhurst, Alfred. Theistic evolution. Standard Pub. Co. Cincinnati. 1919.

Chap. II. Evolution.
Chap. III. Theistic evolution.
Chap. IV. Evolution and the public schools.

"If cosmic theistic evolution is accepted and pushed to its logical results, the Bible as the inspired book of authority in religion will be eliminated. The teaching of evolution should be eliminated from primary and secondary schools by law.

San Francisco debates on evolution. Maynard Shipley *vs.* Francis D. Nichol and Alonzo L. Baker. $1. Pacific Press Pub. Assn. Mountain View, Calif. 1925.

Part II is a debate between Alonzo L. Baker and Maynard Shipley on the question: Resolved, That the teaching of evolution should be debarred from tax-supported schools.

Scopes, John T., defendant. World's most famous court trial, Tennessee evolution case. $2. National Book Co., Box 200. Cincinnati. 1925.

Wells, Gabriel. Tennessee cause celebre. 10p. pa. 50c. Doubleday. 1925.

The pros and cons of the issues involved in the Tennessee trial.

PERIODICALS

Century. 106:157-60. My. '23. Fashions in bigotry. Glenn Frank.

Discusses the prevalence of bigotry in education and science as well as religion and the need for combating it.

Century. 106:637-40. Ag. '23. Liberalizing the fundamentalist movement. Glenn Frank.

Offers "fourteen points" for the program of a real liberal religious movement, a religion of Christ rather than about Him.

Contemporary Review. 128:288-95. S. '25. America and fundamentalism. S. K. Ratcliffe.

A survey of the causes of fundamentalism—the conditions in the United States that brought it about.

Educational Review. 65:74-7. F. '23. Academic freedom, fundamentalism, and the dotted line. A. Wakefield Slaten.

A description of the fundamentalist movement against the teaching of evolution in the schools.

Journal of Religion. 2:225-35. My. '22. Kentucky campaign against the teaching of evolution. Alonzo W. Fortune.

Describes the agitation for anti-evolution legislation in Kentucky, and its effect.

Nation. 120:565-6. My 20, '25. War against evolution. Miriam A. De Ford.

Describes the advance of fundamentalist opinion in the United States and its present status.

Nation. 121:157-8. Ag. 5, '25. Strategy of the Scopes defense. Arthur G. Hays.

Nation (London). 31:68-70. Ap. 8, '22. Kentucky bans evolution. J. S. Huxley.

Comments on the dangers of democratic control of education in its relation to the spread of truth. The average man believes what he likes to believe and would tend to suppress the teaching of any truths difficult to accept.

New Republic. 30:303-5. My. 10, '22. American intellectual frontier. John Dewey.

Describes the intellectual illiberality that underlies Bryan's recent attitude toward evolution, how it came about and how it must be reckoned with.

*New Republic. 38:143-5. Ap. 2, '24. Science, belief and the public. John Dewey.

Describes the danger to thought in the political and economic freedom of so many uneducated. It is the fact that the uneducated public vote on these questions that makes the present reaction against evolution dangerous.

New Republic. 43:58-60. Je. 10, '25. Cure for fundamentalism.

Declares Modernists must wage more active war on the efforts of the Fundamentalists to spread their own ignorance.

Nature. 112:313-14. S. 1, '23. Revolt against the teaching of evolution in the United States. W. Bateson.

Professor Bateson comments on the fundamentalist outbreak against evolution in the United States in its relation to his speech at Toronto.

*Nature. 116: special sup. 68-84, 102-5. Jl. 11, 18, '25. Evolution and intellectual freedom.

Presents the views of leading authorities in the fields of university work, science, and religious teaching in England, regarding the anti-evolution controversy in America.

*New York World. p. 2. Jl. 22, '25. Famed trial took eight court days.

New York World. *See* daily issues from July 11-29, 1925 for reports of the Scopes trial in Tennessee.

North American Review. 219:289-300. Mr. '24. New Testament and fundamentalism. Henry Thatcher Fowler.

Views fundamentalism, as, in part, a phase of the struggle between a modern, evolutionary, and a mediaeval world-static point of view. It has always existed.

Open Court. 39:685-95. N. '25. Tennessee's aid to education. Smith W. Carpenter.

Truth is sometimes inimical to human interests because men are not as they should be. Important to keep all creeds as they are and not overthrow the aid of religion in helping the mass of men to a higher state of civilization.

Outlook. 130:248-9. F. 15, '22. Evolution—"God's way of doing things." Lyman Abbott.

Lyman Abbott's answer to the bill proposing to forbid the teaching of evolution in the schools of Kentucky.

*Review of Reviews. 72:3-4. Jl. '25. Evolution forty years ago.

A brief resumé of the incidents in the battle over evolution from 1884 up to the Scopes trial.

*Review of Reviews (London). p. 235-9. S. '25. Darwin on trial: case against evolution. George McCready Price.

*Round Table. 15:732-48. S. '25. Religion and science in Tennessee.

Discusses the Scopes trial and the issues involved.

School and Society. 22:612-13. N. 14, '25. Teaching the theory of evolution in the schools of Texas.

The Texas State Text-book Board orders all references to evolution to be cut out of text-books by publishers, before books are adopted for use in the Texas schools.

*Science. n.s. 55:264-6. Mr. 10, '22. Proposed suppression of the teaching of evolution. Henry Fairfield Osborn; Edwin Grant Conklin.

Answers to Bryan's proposal to exclude the teaching of evolution from schools and colleges.

Science. n.s. 61:367-8. Ap. 3, '25. Evolution in education in California: report of committee.

Nine college presidents report on the teaching of evolution as set forth by the list of high school text books of science submitted. Books show no conflict between science and religion.

Science. n.s. 61: sup. x-xii. My. 29, '25. American association for the advancement of science and legislation against the teaching of evolution.

Resolution of the Association supporting the theory of evolution and the teaching of it.

*Science. n.s. 61: sup. x, xii. My. 29 '25. Anti-evolution legislation in the various states.

Describes briefly the legislation attempted or passed in Tennessee, Florida, Kentucky, North Carolina, South Carolina, and California.

Science. n.s. 61: 647-8. Je. 26, '25. Three letters bearing upon the controversy over evolution. W. C. Curtis.

Quotes Bateson correctly, and refutes the Fundamentalist's authority "Etheridge."

School and Society. 23: 25-31. Ja. 9, '26. How to teach evolution in the schools. Henry Fairfield Osborn.

Evolution should be taught in such a way as to exalt and beautify the entire conception of life rather than to debase or materialize it.

Scribner's Magazine. 78: 451-8. N. '25. Science and the faith of the modern. Edwin Grant Conklin.

Science has not destroyed but has contributed greatly to the foundations of ethics and religion.

Survey. 52: 389-92. Jl. 1, '24. Does fundamentalism obstruct social progress? pro and con. Charles P. Fagnani; J. G. Machen.

Woman Citizen. n.s. 10: 7-8. Jl. 11, '25. Evolution —fifty years ago. Carrie Chapman Catt.

The author gives reminiscences of her own youth in contact with the doctrine of evolution, and puts forward the proposition that children should be taught all the truth.

*World's Work. 45: 509-13. Mr. '23. Freedom in school and church. William H. P. Faunce.

Describes the dangers to the faith of the mass of mankind, of dogma, either of science, or of fundamentalism.

World's Work. 46: 605-14. O. '23. Down with evolution. Rollin Lynde Hartt.

An account of the present fundamentalist war on the teaching of evolution in schools and colleges.

World's Work. 47:48-56. N. '23. Fighting for infalibility. Rollin Lynde Hartt.

Another article on the present Fundamentalist's war on the Modernists.

See also articles in the Readers' Guide to Periodical Literature under the heading: Tennessee Evolution Controversy.

INTRODUCTION

INTRODUCTION

THE DOCTRINE OF EVOLUTION [1]

The term evolution, as today used in science, means the historical process of change. When we speak of the evolution of man-made products like automobiles and steam-engines, of social institutions like democratic government, of the crust of our earth, of solar systems, of animals and plants, we mean a gradual coming into existence of what is now before us, in contrast to its sudden and miraculous creation. Such an idea is of recent origin. Our intellectual forbears of a few centuries ago thought in terms of a world created in its present form. The evolutionary point of view marks an advance from the concept of a static universe to one that is dynamic. In the phraseology of the street, the world is *a going concern,* historically as well as in its present aspects.

Evolution is, therefore, *the doctrine of how things have changed in the past and how they are changing in the present.* It may be naturally divided into its cosmic, geologic and organic aspects, as represented by the sciences of astronomy, geology and biology.

Cosmic Evolution

Cosmic evolution really includes all other forms, for by the cosmos we mean the entire visible universe, our very bodies as well as the farthest star. But in practice, one thinks of the cosmos as remote. And what we have in mind under cosmic evolution is the changes that are postulated by the science of astronomy. It is believed by astronomers that our solar system with its central sun, its planets and lesser bodies has not always been in existence from a remote period of time. Our earth seems to have been once molten and before that perhaps gaseous. Although the famous nebular hypothesis of La Place has been in part replaced by other theories, the belief of modern astronomy is that our solar system and perhaps countless others have arisen by an evolutionary process whose extent is infinite in both time and space. I take it that few will combat the concepts of astronomy regarding the nature of our sun and its planets. Even when some of us were children the idea of cosmic evolution as set forth by the nebular hypothesis was taught in school geographies. The point is not whether the nebular hypothesis, the planetesimal hypothesis or the like is correct, but that the astronomer regards the heavenly bodies as having reached their present state by an evolutionary change, continuous through an unfathomable past and presumably to be continued into a limitless future. There is no longer talk among intelligent or educated men—or there should not be—of "heaven and earth, center and circumference, created all together, in the same instant, and clouds full of water, on October 23, in the year 4004 B.C. at nine o'clock in the morning," as was determined by the chronology of Dr. John Lightfoot in the seventeenth century. The astronomical evidence for the development of such a dynamic universe in space and time is of course limited. But it all points in the direction of evolution.

---

[1] From address by Professor Winterton C. Curtis, Professor of Zoology, University of Missouri, delivered before the Science Section of the Missouri State Teachers' Association, Kansas City, November 18, 1922. *School and Society.* 17: 393-405. April 19, 1923.

Geologic Evolution

Geologic evolution overlaps with cosmic, since the geologist takes the evolutionary problem where the astronomer leaves it. Geology deals with the history of our earth, how it originated and how it has assumed its present form. Astronomy deals with the origin of the earth as a planet of our solar system. Geology finds evidence that the earth was once a molten mass which has since become cooler. What may be called the "countenance" of the earth is the subject matter of geology, how the land lies at the present day, how rocks and soil are being produced, and what these facts imply regarding historical origins. The evolutionary evidence of astronomy is vague and remote, although generally accepted by the layman. The evidence from geology is written in the ground beneath our feet. The geologist's belief in a vast lapse of time and stupendous changes rests upon evidence that is everywhere at hand. Leonardo da Vinci in the fifteenth century grasped the significance of important geologic facts, when he wrote concerning the saltness of the sea and the marine shells found as fossils in the high mountains. Since the publication of James Hutton's *Theory of the Earth* in 1795, it has been the cardinal principle of geological science that past changes of the earth's surface are explicable in terms of changes now in operation. For example, such a vast chasm as the Grand Canyon is explained not as produced by miraculous creation or by sudden catastrophe, but by running water acting upon the rocks throughout innumerable centuries. The process may be observed in miniature in the wash of the clay soil in our Missouri fields. The weathering of rock into soil, erosion with its transportation of the products of weathering, deposition of the material in the oceans or in large bodies of fresh water, uplift of the ocean's floors and its hardening into rock may all be seen in slow but certain progress in various parts of the world at the present day, and their occurrence in the past is recorded in the rocks. The sub-title of Charles Lyell's famous book, the *Principles of Geology,* published in 1830, runs as follows: "an attempt to explain the former changes of the earth's surface by reference to causes now in operation." Lyell established the idea of evolution as the only reasonable interpretation of geological facts and his elaboration of Hutton's doctrines still constitutes the very foundation of geologic science. Today, geology without an evolution of the earth's surface, from a molten mass to its present form and extending over millions of years, would be on a par with a science of geography postulating a flat earth. The conclusions of modern astronomy and geology, therefore, point to an evolutionary process involving many millions of years and still in progress—to an earth hoary with age and still growing old.

So far so good. Astronomy and geology despite their practical importance are remote from human concern, in so far as their evolutionary doctrines are concerned. To borrow from the phraseology of Mr. Bryan, the age of the rocks is of no particular consequence in so far as the rock of ages is concerned. Cosmic evolution and geologic evolution are readily accepted by the laity on the authority of science, because they do not seriously interfere with doctrines that are deemed vital. But the evolution of plants and animal life, and hence human evolution, is inseparable from that of inorganic matter as described by astronomy and geology, because of the fossils in the rocks.

Organic Evolution

Organic evolution resembles the cosmic and geologic evolution above described, since it concludes that the living bodies, which are the objects of its investigation, have not always existed as they are today, but have undergone a process of change. As with the evidence of geologic change, the evidence for an evolution of animals and plants rests upon facts that are immediately before us, for example, the structure and development of animals, their distribution over the earth, the fossils in the rocks. Our time will permit of only enumeration and brief characterization of the recognized lines of evidence for organic evolution, which are as follows:

1. Evidence from structure is derived from:
    - Comparative anatomy
    - Comparative embryology
    - Classification

2. Evidence from distribution, past and present, is derived from:
    - Palaeontology
    - Zoogeography
3. Evidence from physiology is derived from:
    - Fundamental resemblances in vital processes
    - Specific chemical resemblance of closely related forms, *e.g.*, blood tests
4. Evidence from experimentation rests upon:
    - Unconscious experimentation upon animals and plants since their domestication
    - Conscious experimentation of breeders and of scientific investigators

The nature of these lines of evidence may now be indicated.

Evidence from comparative anatomy: In the animal kingdom as a whole and in every group of animals whether large or small, we find facts that may be interpreted most reasonably in terms of evolution. The vertebrates or backboned animals will serve as an illustration. We find here a certain plan of structure, for example, backbone, two pairs of limbs, body, head, and various internal organs, all laid down according to a similar general plan, but with endless modifications to suit the mode of life. The flipper of a whale, the wing of a bird or a bat, the fore foot of a horse, the arm of a man, and the like, all show the same plan of structure. One of the pre-Darwinian ideas was that each animal, while created separately, was nevertheless formed in accordance with a certain ideal type that the Creator had in mind, hence the resemblance. Such an idea is a theoretical possibility, provided there is any evidence to show that animals were created all at once and separately. But there is not a shred of such evidence that will appeal to one who approaches the matter with an open mind and uninfluenced by preconceived notions.

On the other hand, the biological explanation of this anatomical resemblance is that the present vertebrates (fishes, amphibia, reptiles, birds and mammals) have all descended from a primitive race somewhat like the present fishes. All vertebrates are now alike, because they have never lost the underlying plan of structure inherited from their common ancestry. They have come honestly and naturally by their present organization.

The evidence from fossils (paleontology) interlocks with the above, since the first vertebrates known to appear were primitive fish-like forms. These were succeeded by amphibians, reptiles, mammals and birds in the order named, the last two having connecting links with the reptiles. The invertebrate groups tell a similar story.

Turning to the facts of comparative embryology: The kind of evidence everywhere discoverable may be illustrated by the gill-slits in the embryos of higher vertebrates like reptiles, birds and mammals. All these forms exhibit in their early stages of development a fish-like plan of structure, particularly in the neck region where the gill-slits are located. The reasonable interpretation of the existence of such structure, in the embryo of a human being, or any land-living vertebrate, is that we have never lost these telltale evidences of our ancestry. The later stages of our development are modified so that they lead to the adult human body. The earlier stages still show the primitive conditions of a fish-like organization. Modern fishes have survived to the present day without a fundamental departure from the ancestral condition. Modern amphibia (frogs, toads, and salamanders) have survived in the half-way state between an aquatic and a terrestrial existence, through which higher vertebrates have passed as indicated by the fossil record and by the above fish-like stages in their development.

The facts of classification are commonly cited as evidence for evolution. Since classification is based on structure (anatomy), this is but an aspect of the general evidence from comparative anatomy and embryology.

While the facts cannot be detailed here, they are striking and bear out the doctrine.

Another line of evidence is that of geological and geographical distribution: The facts in this connection are utterly senseless and insulting to an intelligent Creator, if viewed as a result of special creation. One can simply say, "God did it," and not ask why. But such explanations do not satisfy modern minds. On the other hand, their explanation in terms of evolution gives reasonableness and consistency to a large body of facts. The fossils appear in such an order in time as to constitute evidence for evolution. Existing animals are distributed over the surface of the earth in a manner that confirms their geological origins.

The facts of physiology tell a similar story. Life and the living stuff is the same sort of thing wherever we find it, thus lending support to the idea that it has all descended from the same primitive source from which it has inherited its resemblances. A more striking line of physiological evidence is the recently discovered chemical resemblance between the blood of animals previously supposed to be closely related on grounds of their anatomical similarities, for example, apes and monkeys, birds and reptiles, and the like. Two entirely independent lines of evidence are here found to interlock to such an extent that evolution is the one reasonable interpretation.

Finally, there is the evidence from experimentation: Evolution has taken place before the eyes of men, during the period since animals and plants were first domesticated. The changes have not been profound, because the ten or twenty thousand years since the first animals and plants seem to have been brought under domestication is a brief span of time for evolutionary modification. But it is clear that such modification has occurred and is today occurring under the direction of skillful breeders. The modern science of genetics is beginning to solve the problem of how evolution takes place, although this question is one of extreme difficulty.

The foregoing summary of the various lines of evidence is hopelessly inadequate, since books could be written on each. The point to be appreciated is that all the multitudinous facts of biology hang together in a consistent fashion when viewed in terms of evolution, while they are meaningless when considered as the arbitrary acts of a Creator who brought them into existence all at once a few thousand years in the past. Modern biology has developed around two major generalizations, the cell doctrine, and the doctrine of organic evolution. Modern evolutionism dates not from Darwin's *Origin of Species,* published in 1859, but from the *Histoire Naturelle* of Buffon, the first volume of which appeared in 1749, and from the work of the other philosopher-naturalists of the eighteenth century. It is a sad comment upon the state of popular information that the practical facts of biological science are everywhere acknowledged, while the status of its greatest philosophical generalization remains so commonly unknown. In view of its implications and applications, the doctrine of evolution is second to none other in modern thought. It has been established by a gradual but irresistible accumulation of facts.

THE FACT, THE COURSE AND THE CAUSES OF ORGANIC EVOLUTION

At this point, we may examine a common misunderstanding with reference to evolution and the work of Charles Darwin. Suppose we begin with an analogy, illustrating what may be termed "the fact, the course, and the causes" in a progressive series of events. A ship leaves a European port and sails across the Atlantic to New York harbor. We may distinguish between: (1) the fact that the ship actually crossed the ocean, instead of being "created" in the harbor of New York; (2) the course the ship may have pursued, whether direct or indirect, and the like; and (3) the causes that made the ship go, whether an internal propelling force like steam or electricity, an external force like wind or current or even direction by wireless. Compared with the doctrine of evolution, we have: (1) the fact of evolution, as representing the historical series of events; (2) the course followed in evolution, for instance, whether the land vertebrates arose from fish-like ancestors, birds from reptiles, or the like; and (3) the causes of evolution or what made and makes it happen. These three aspects, like those in the voyage of a ship, are separate though related items. They must be constantly distinguished, if there is to be any clear thinking on this matter by one who is not a scientist.

It is now possible to explain the misunderstanding above cited. The historical fact of evolution seems attested by overwhelming evidence. Science has nothing to conceal, it stands "strong in the strength of demonstrable facts," and invites you to view the evidence. The course pursued by evolution is known broadly in many instances, but in the nature of the case the evidence is limited and many of the steps will always remain uncertain, without, however, a calling in question of the historic fact. The causes of evolution present the most difficult problem of all and the one regarding which we know the least. The recent strictures of Professor Bateson, which have been exploited by anti-evolutionists, were directed wholly at current explanations of evolutionary causation and the course of evolution. He affirmed his belief in the historic fact when he said "our faith in evolution is unshaken"—meaning by "faith," of course, a reasonable belief resting upon evidence.

With this distinction between fact, course and causes clearly in mind, the significance of Darwin's work in the history of biological thought can be understood. Darwin's accomplishment was two-fold. In the first place, he established organic evolution as the only reasonable explanation of the past history of living things. Secondly, he offered, in natural selection, what then appeared an adequate explanation for the origin of species and hence for the causes of evolution. Darwin's evolutionary argument in his *Origin of Species* was that one species could give rise to another "by means," as he believed, "of natural selection or the preservation of favored races in the struggle for life." If one species could be shown to give rise to another, the same process could be continued. No limit could be set. The types thus produced could depart indefinitely from the parent form. Once the mutability of species be admitted, the only reasonable conclusion is that evolution has taken place. His argument was supported by an immense collection of facts along observational and experimental lines. The total result was overwhelming, coming as it did more than one hundred years after the original promulgation of the theory of transmutation and its repeated rejection by the main body of naturalists. Evolution was accepted so quickly by scientists that the world was startled. This sudden conversion gave rise to the impression, even among scientific workers, that no serious contribution to evolutionary theory had been made before the work of Darwin. Such an impression does not represent the facts and it does grave injustice to the pioneer thinkers of the eighteenth century to whom we have alluded. . . .

The importance of Darwin's work in the history of scientific thought is that it convinced science of the truth of organic evolution and proposed a then plausible theory of evolutionary causation. Since Darwin's time, evolution as the historic fact has received confirmation on every hand. It is now regarded by competent scientists as the only rational explanation of an overwhelming mass of facts. Its strength lies in the extent to which it gives meaning to so many phenomena that would be meaningless without such an hypothesis.

But the case of natural selection is far different. Of recent years, this theory of the causes of evolution has suffered a decline. No other hypothesis, however, has completely displaced it. It remains the most satisfactory explanation of the origin of adaptations, although its all-sufficiency is no longer accepted. The initial step in evolution is the appearance of individual variations which are perpetuated by heredity, rather than the selection of variations after they have appeared. The interest of investigators has shifted to problems of variation and heredity as exemplified by the rise of the science of genetics.

As a result of this situation, there has been much discussion among scientists regarding the adequacy of what is often referred to as the Darwinian theory, meaning natural selection. In condemning selection as an inadequate explanation of the problem, biologists have often seemed to condemn evolution itself. It is not strange that the layman, for whom Darwinism and evolution are synonymous terms, believes that evolution has been rejected when he hears that belief in Darwinism is on the wane. He does not understand that what is thus meant by Darwinism is not the historic fact of evolution, but the proposed cause of evolution—natural selection. This point may not seem vital, but those interested in biological science frequently find the situation used to support claims that the entire concept of organic evolution has fallen into disrepute. There are many, even today, who rejoice at anything that appears to weaken this major generalization of biology.

Such then is the more strictly scientific status of the doctrine of evolution as a whole. The origin, by evolution, of the heavenly bodies and of our earth is evidenced by facts of astronomy and geology, as set forth in any elementary treatise on these sciences. Inorganic evolution or the modification of non-living matter is thus supported by science and does not find serious opposition in the public mind. Organic evolution or the origin of animal and plant life receives a similar support from the facts of biology. If the origin of man were not involved, there would presumably be little serious opposition from non-scientific sources at the present day.

HUMAN EVOLUTION

But with the evolution of all other living things, both animal and plant, overwhelmingly attested by the facts, it is not only impossible but puerile to separate man from the general course of events. Moreover, the evidence for man's origin is becoming clearer year by year. Comparative anatomy, embryology, classification, physiology, geographical distribution, fossils, and the existing races of mankind tell the same story for man as for the rest of the animal world.

Huxley's essay, entitled *Man's Place in Nature,* presents in a masterful manner the anatomical evidence for our kinship with the four species of tailless apes—the Gibbon, Gorilla, Orang and Chimpanzee—and his most significant conclusions are even more strongly established at the present day. If creation occurred "at 9:00 A.M. on October 23, of the year 4004 B.C.," as part of the Divine plan, it is amazing that such success should have dogged the steps of the students of human skeletal and cultural remains during the last half century. The skeletons in part or in whole are known for a number of subhuman races and a vast array of implements and other remains, all showing a progressive advancement. By another fifty years, it seems safe to expect that much more of the story will be unveiled. It is further amazing that investigations in Egypt show the existence of a flourishing civilization in the Nile valley as early as 5000 B.C., and back of this a gradual development from the barbarism of the stone age.

On man's intellectual side, psychology is making increasingly evident the essentially animal foundation of human intelligence. Man's claim to importance in the universe revealed by science lies not in the pretense that this planet was created for his convenience, but in the claim that he transcends the material universe in so far as he comprehends it. And the method of such comprehension that dominates modern thought is the method of science, not that of theology.

THE PRESENT STATUS OF EVOLUTION [1]

The doctrine of evolution is not a new doctrine. Most every tribe had its theory concerning the origin of life and of the world. The philosophers of Greece were greatly interested in the origin of life.

Anaximander, who lived six hundred years before Christ, taught that the world was first a fluid. Gradually this fluid began to dry and grow thicker, and here and there, where it thickened most, dry land appeared. When this dry land had become firm enough to serve as his home, man came up from the water in form of a fish. Slowly and gradually the fish, struggling about the land, gained for himself the limbs and members needed for his new situation and developed into man. After him other animals came up much after the same fashion, then the plants, until the whole world was clothed with its inhabitants.

Empedocles, who lived one hundred and fifty years before Christ, taught that in the beginning there were all sorts of strange, incomplete and misjointed creatures which swarmed upon the earth, having sprung up out of the world itself. Each was a chaos of the limbs which afterward were to belong to other animals which needed them more. Slowly and gradually an interchanging came about by which appropriate limbs fastened themselves to proper animals. The last of these misjointed creatures is the one known as the centaur, half man, half horse. After all the members had found their proper places the animals were complete. In his thought the more perfect animals had arisen out of the less perfect, the change came about gradually and in this respect foreshadowed our later idea.

Anaxagoras, who lived from 500 to 428 B.C., was the first one to oppose the theory of creation by blind force and adopted the theory that the organizing force is intelligence. He lays down the principle of the *nous* or mind. The origin of things according to Anaxagoras must transcend the material realm and find its origin in the *nous.* He was the first one to believe that there was an intelligent design back of the creation of animals and plants. He believed there was originally a slime in which were the germs of later plants, animals and minerals mixed in a chaos. Slowly order arose. Out of the mixture settled first the minerals forming the earth, with the air floating above it, and above the air was the ether. Out of the air, the germs of plants settled upon the earth, and vegetation covered the mineral floor. Then from the ether came the germs of animals and men. These settled among the plants and sprang up into the animals of the world, as well as people.

---

[1] By Rev. Paul J. Dundore, pastor of the Reformed Church, Greenville, Pa. *Reformed Church Review.* 3: 1-51. January, 1924.

Aristotle was an evolutionist. He believed the whole world to be vital and not a mechanism. In place of the archetypes and ideas of Plato which gave rise to plants and animals through the instrumentality of a God who was an architect rather than a creator, Aristotle substitutes the aid of form from which everything originates. Aristotle posits four causes which help to determine things. A cause according to Aristotle is not the immediate antecedent of anything but the whole condition that determines things. (1) The first cause is the material, which represents the stuff out of which the material is made. (2) The second cause is the formal, which represents the ideal in the mind of the artist when he is about to carve a statue out of the rough marble. (3) The efficient cause is simply the agency or instrumentality that passes from the material form. (4) The final cause consists of the purpose for which things are made. These four causes may be explained by means of a statue. Take, for instance, Zeus. The rough marble that possesses the potential statue is the material cause or form. The formal cause is the ideal of the statue as it exists in the mind of the artist but which still is imprisoned in the marble. The efficient cause represents the agency that brings the ideal out of the rough form, the arm of the workman. The final cause represents the purpose for which the statue was made. It was made to be placed in the temple for an object of worship. Aristotle posits a prime mover in his system of evolution and this prime mover is God. In his psychology he distinguishes between three grades of souls:

1. Vegetable, where there is nutrition and growth.
2. Animal, where sensation and locomotion are added.
3. Human stage, where rationality appears.

These theories concerning the origin of things may seem childlike to us but they give evidence to the fact that men, many centuries ago, battled with this problem and some have blazed the path for later scholars.

If time would permit, it would prove interesting to study some of these older conceptions bearing on the origin of the world. Prominent among these is Philo's conception which is akin to Plato's of an uncreated world. Matter is uncreated. God is viewed as a maker rather than creator. He is transcendent and His relation to the world He has made is mediate rather than immediate. He, therefore, works through the *logos* and *logoi*. The *logoi* are the efficient causes which make effective in the world the wisdom and power of God. The *logoi* of Philo are substituted for the archetypes of Plato. Philo was a contemporary of Christ. Philo's system of thought finds expression in the prologue of John's gospel.

At a later stage Plotinus propounded his doctrine of emanation. The world, including man, emanated from the highest emanation, which is God. He is the first emanation. These emanations correspond to the *logoi* in Philo's system. There is an emanation from an emanation and in this way we come down to the lowest material stage. This is a doctrine of devolution rather than evolution. The world was made from above downward. All creation is a degeneration in that it is getting away from

God. The world has travelled downward and distanced itself from God and the creature wants to get back. The path of knowledge and virtue is the reversal of the order of emanations.

Among the Jews and the early Christians the stately and beautiful account of Genesis sufficed for all their needs. Their minds were occupied with other questions.

But after Christianity had fortified itself and the mind was free to think, the problem again presented itself for solution. St. Augustine, probably the greatest of the so-called fathers of the church, interpreted the language of Genesis to mean that in the beginning God planted in chaos the seed that afterward sprang up into the heavens and the earth. He further says that the six days of creation were not days of time, but a series of causes, and that, in the order described as these six days, God planted in chaos the various beginnings of things. These in the fulness of time sprang up into the world as we know it now.

During the Dark Ages, the school men of whom Thomas Aquinas was the main exponent, stated that it would be easy mistakenly to believe that the author of Genesis meant to convey the idea that on each of the six days certain acts of creation were performed. It is quite evident, says Aquinas, that in those early times God created only germs of things and put into the world power which should later become active. After the Creator thus endowed the earth he rested from the work, which proceeded to develop under the influence of these first germs.

Almost four hundred years later men started to find a solution to this perplexing problem. A number of men firmly believed in evolution but they had to safeguard their assertions lest they be excommunicated from the church. Prominent among these were such men as Descartes and Leibniz. Newton, by his law of gravitation, had brought order into the heavens. Emanuel Kant looked longingly for a greater Newton, who should find a greater unity in the animal world.

The beginning of the nineteenth century gives us the first great contribution to the idea of evolution, although the path was blazed in the eighteenth century by Buffon and Erasmus Darwin, the grandfather of Charles Darwin.

Lamarck, a truly recognized pioneer in this work, conceived the cause of progress was somewhat as follows: The desire for any action on the part of an animal leads to efforts to accomplish that desire From these efforts came gradually the organ and its accompanying powers. With every exercise of these powers the organ and its corresponding function became better developed. Every gain either in function or in organ was transmitted to those of the next generation, who were thus enabled to start where their parents left off. The general environment constantly gave the stimuli that led to the adaptive changes.

This was a great step in advance and evolution would have been accepted as a theory then had it not been for the powerful influence of the mighty Baron Cuvier who taught that species were fixed. They were all alike because they had been made by the same Creator. Agassiz, his student, labored in this country and these two men gave a blighting setback to the views advanced by Lamarck.

It, therefore, became the task of Charles Darwin to give the evolution theory a place in the thinking world. Today he is recognized as the father of the evolution theory not because he was the first one to think along these lines but because he succeeded in bringing it and keeping it before the attention of the thinking world. Had Darwin confined his research to geology or the study of lower animals he would have encountered no opposition. Lyell had shown that the present condition of the earth's crust had come about gradually through the action of causes still at work. This theory is generally accepted. But Darwin conceived the whole realm of the world as a universe and not as a multiverse and therefore applied the principle of evolution to things animate as well as inanimate and this caused the upheaval.

We shall note a few conceptions underlying Darwin's idea of natural selection which seems to be the outstanding contribution of Darwin to this subject.

1. *Heredity*—Darwin teaches that it is a common observation that every animal or plant produces off-spring after its own kind. Under no conditions would we expect a duck to lay an egg from which could be hatched anything but a duck. We believe that the dog has descended from some form of wolf, but it is not meant that at any time in the past any wolf mated with a wolf ever produced pups that were anything but wolves. The account in Genesis "Let the earth bring forth the living creature after his kind" is correct. This fact which the opponents of evolution harp upon continuously does not concern us. Darwin accepts this truth as the natural order of things. Heredity is the conservative force of nature.

2. *Variations*—While Darwin believed that parents produce offspring of their kind, that animals belong to the same species or genus, even the same variety, none the less he believed that no animal is exactly like his parents. Each offspring will differ in some small point in the group. This is obvious. No two blades of grass are exactly alike. The leaves on the same tree differ. It is a variation in animals of the same parentage and amid the same surroundings which in the mind of Darwin made evolution possible. He always claimed that it was the continuous accumulation of these small variations that finally produced the profound changes, changes which either produced new species or their equivalent.

This study of variations is perplexing and here we find a great diversity of opinion among the exponents of the evolutionary theory. The old idea that every acorn had in it a miniature oak which only needed to unfold itself, or that the hen's egg had within it a miniature chick which only needed that warming process in order to make it evident, could not possibly survive the invention of the microscope.

Darwin shared the opinion of Lamarck that variations were due either to two causes, direct action of the environment and use or disuse, or to other as yet unknown causes, which Darwin calls "chance variations." Both Darwin and Lamarck believed in acquired characters as inherited, though some were inherited doubtless more strongly and persistently than others.

Weismann, a German zoologist, two years after Darwin's death, in 1883, brought forward a new classification of variations and a new theory of heredity. Weismann showed that some variations are born with us, are in the blood, so to speak, while others are acquired through the action of environment, use or disuse. Acquired characters, according to Weismann, are not inherited. He differentiated the cells which form the various parts and tissues of the body from the reproductive cells. He called the cells which make up the body SOMA; whereas the reproductive cells he called germ cells or collectively the GERM-plasm. Weismann maintained that the germ cells, since they are not descended from body-cells but only from the fertilized egg-cell, have no way of transmitting body-modifications, that is, acquired characters. The germ-cells are guests in the body, but not members of the household. According to Weismann germ-cells and the body are distinct and hence heritable variations cannot have their origin in body-cells but only in germ-plasm. I think biologists accept Weismann's view thus far and in consequence the study of heredity and variations is limited to the study of germ-cells which are recognized as the sole vehicles of inheritance.

Darwin, who believed, in common with other biologists in his day, that acquired characters were inherited, taught that bodily modifications must in some way be registered in the germ-cells and he framed a theory known as pangenesis to explain how this could come about. In this particular he was not correct. Darwin himself was not convinced of its correctness and advanced the theory as tentative only.

As to the matter of instinct it is well known that animals do, generation after generation, the same acts in the same way. The Lamarckian school would account for such instincts by the law of habit and view reproductive cells as store houses of racial experience or habit which animals transmit as instincts. Weismann and his followers view instincts as arising because the structure of the germ-plasm necessitates a particular response when certain external stimuli are operative, not at all because such a response has before been operative by the ancestors. According to the Lamarckian view a hen sits on eggs because her ancestors have formed the habit of incubating eggs; according to Weismann's view the hen sits on eggs because she cannot help doing it; when she is in a certain physiological state and the nest of eggs is there, she sits, and that is all there is to it. This whole matter of instincts as related to heredity and variations is still hazy but it relates itself vitally to the theory of evolution. We do know that as intelligence increases in the animal kingdom, instincts sink more and more into a subordinate position. Dr. Waldron stated the truth admirably thus: In insects instincts predominate with a gleam of intelligence while in man intelligence predominates with a shadow of instincts.

But the discussion raised by Weismann has led us to seek the origin of variations in the germ-cells.

Hugo de Vries, the Dutch botanist, made a thorough study of the variation of species of plants in the field, transferring these variations to his garden and there subjecting them to selection. He found that plants in his garden under careful cultivation and improved nutrition, increased variability as regards minor differences in size, luxuriance and productiveness. De Vries appears to think that selection upon continuous variations may change the average condition of the race, but that such changes will not persist unless maintained by rigorous selection. As soon as selection ceases, he thinks, the race begins to return to its former condition.

In line with the discoveries of De Vries, the biologist finds in the nucleus of every germ-plasm or growing cell certain minute bodies called "determinants" and these determinants are necessary for the reproduction of the cell. Each of these determinants may be fitted to produce slightly different results. Some determinants find expression in life, some not. One determinant may be more favorably placed than others in the cell, and, in consequence, has secured more nourishment which comes to the cell in the blood of the parents. If this be true then it certainly would be favored in the competition. Variations take their origin in the germ-cell and often arise from proper nutrition given to certain determinants.

The Mendelian law of heredity seems to hold sway at the present time in this entire field. It elaborates on the theory of De Vries, though it was formulated before De Vries made his studies of plant life. It views heredity from the viewpoint of the germ-plasm which Weismann discovered as the real fundamental factor in heredity.

Mendel posits three fundamental principles:

(1) The principle of independent unit characters. This principle states that the qualities or characteristics of organisms are, or may be analyzed into, distinct units that are inherited independently. It follows that the characters of parents or of particular relatives are not inherited as a whole but each individual is a mosaic of characters that appear in a variety of relatives.

(2) The principle of the determiner. This principle states that each unit character is represented in the germ by a molecule or associated groups of molecules called a determiner. These determiners are transmitted in the germ-plasm and are the only things that are truly inherited. A child resembles his father because he and

his father are developed from the same stuff. Both are chips from the same old block. These determiners give rise to infinite variations due to nourishment received while in the germ and other influences.

(3) The principle of segregation of determiners. This principle of segregation of determiners in the germ-plasm states that characteristics do not blend. That if one parent has a characteristic while the other lacks it, then the off-spring gets a determiner from one side only instead of from both sides and when the germ-cells are formed in such off-spring half of them have the determiner and half of them lack it. There is thus a segregation and absence of the determiner in the germ-cells of the mixed off-spring. When the determiner of a characteristic is absent from the germ-plasm of both parents it will be absent in all of their off-spring.

We see, therefore, that the presence or absence of these determiners and the nutriment they receive in the germ-plasm have a tendency to variation. Variation must take place in the germ.

Another process of variation more easily understood is brought about by double parentage. The barred Plymouth Rock chicken had its origin in such a double ancestry. The one parent was a black Java whose color has disappeared entirely in the cross, but whose single comb, with its few large points, comes out clearly in the newly produced fowl. The other parent was a barred Dominique. It is to this parent that the Plymouth Rock owes the interesting cross marks on its feathers. That variation results from double parentage is very evident.

From this study we are led to believe in variation, though not produced according to the theory advanced by Darwin. Heredity, the conservation force of nature, leading animals and plants to produce of the same kind, prevents the world from becoming a wild kaleidoscope and fantastic dream. Variations underlie the development of new departures which keep the world from becoming dull, unending repetition of the same monotonous material. Variation is the progressive tendency in nature.

3. *Multiplication*—This is Darwin's third basal idea in evolution. Animals and plants multiply. They do not merely increase, they increase in geometric ratio. Anyone who has worked out one of these geometric ratios knows how wonderfully they mount up. There is an old familiar story of the blacksmith who asked the price at which the stranger would sell the horse he was shoeing. The owner of the horse replied that, if the blacksmith would give him one penny for the first nail he drove in the shoe, two for the second, four for the third, and so on, he might have the horse. Not any one hundred average price horses in the world would bring such a price. This gives us an idea of what would happen in the world if animals could multiply unrestricted. The usual number of eggs laid by a mother robin for a single brood is four, and she may produce two broods in a season. This would mean that the original pair had produced eight offspring, four times their own number. Turtles and frogs are more prolific. The cod-fish lays nine hundred and ninety eggs in a season. It is very evident that only a limited number can survive. This idea of Darwin has won acceptance.

4. *Selection*—This is Darwin's fourth basal idea. When man produces new varieties of animals he does it by picking out from his flocks or his herds such as conform most nearly to his idea of what is desirable. These he mates and from their progeny he selects the ones that suit him best. Generation by generation he gets domesticated animals to conform more nearly to the standard of his desires. Natural selection works after a similar fashion.

Of all eggs produced by animals the larger part never develop at all. Some are dried up, eaten by enemies or are overtaken by some calamity. Of the animals that emerge an overwhelming majority die in a short time.

Before Darwin people thought the ones surviving were favored by accident. Darwin shows us that it is not a mere matter of chance but of superiority, of advantage one has over the other in the procurement of food, advantage in battle. This is what Darwin calls natural selection. Herbert Spencer coined the phrase, "The survival of the fittest."

We have seen that every animal produces after its own kind, and the off-spring, while it resembles the parent closely, still is susceptible to variations. We have also seen that there are too many animals born and a process of selection becomes necessary.

Under our own observation we notice no change of species. As far back as man's memory runs animals seem to have been what they are now. There has been a development within species but as far back as man's historical record goes they seem to have suffered no great alteration. But this, in itself, is no evidence that no such changes have taken place.

Darwin tried to prove two propositions, *viz.*: (1) That there is such a process as evolution; (2) that he had discovered the method by which evolution was accomplished.

The scientific world has accepted the first proposition. As to the second proposition, bearing on the method used in the process, there is a marked difference of opinion. Darwin endeavored to discover an agent which brings about such an actual transformation in animals and plants. This agent he called natural selection. Many biologists doubt whether unaided natural selection will account for the constant advance in organisms.

Most biologists claim that selection does not account for the appearance of variations but only for their preservation, and that any valid theory of evolution must show how variations originate. Darwin's theory of evolution, as I understand it, has its main difficulty here.

I rather think the tendency of the present day among biologists is to accept the theory propounded by De Vries and Mendel relative to the theory of variations.

The assertion is often made that Darwinism is disclaimed by the scientific world. This assertion is false. The scientific world accepts Darwinism as a principle of evolution but does disclaim, in many quarters, the method by which the process of development is accomplished. Persons should be careful in making this distinction between principle and method.

The statement that "Darwinism is dead" has been hailed with joy by those who have always denounced evolution as wicked and opposed to Scripture. The statement that Darwinism is dead does not mean that the evidence for the evolutionary hypothesis has in any way been weakened so that any really competent man of science doubts our animal derivation. It only means Darwin's explanations of how one species may have been derived from another, has proved, as a result of increasing knowledge, to be mistaken or wholly inadequate.

In the warfare waged between persons in favor of and opposed to evolution the assertion is often made by the opposition that the theory of evolution is being abandoned and the American Association for the Advancement of Science has been quoted repeatedly as approving the revolt against evolution. At the Boston convention held in 1922, this association, which is one of the largest scientific bodies in the world, with a membership of over eleven thousand took formal action on the subject and defined its position in a clear statement so as to correct these misleading statements that have been circulated. The statement is as follows:

> We affirm that so far as the scientific evidences of evolution of plants and animals and man are concerned, there is no ground whatever for the assertion that these evidences constitute a mere guess. No scientific generalization is more strongly supported by thoroughly tested evidences than is that of organic evolution. We affirm that the evidences in favor of the evolution of man are sufficient to convince every scientist of note

in the world, and that these evidences are increasing in number and importance every year. We affirm that the theory of evolution is one of the most potent of the great influences for good that have thus far entered into human experience; it has promoted the progress of knowledge; it has fostered unprejudiced inquiry; and it has served as an invaluable aid in humanity's search for truth in many fields. We are convinced that any legislation attempting to limit the teaching of any scientific doctrine so well established and so widely accepted by specialists as is the doctrine of evolution would be a mistake which could not fail to injure and retard the advancement of knowledge and of human welfare by denying the freedom of teaching and inquiry which is essential to all progress.

PART I

THE THEORY OF EVOLUTION

FOR EVOLUTION

EVOLUTION A GEOLOGICAL DOCTRINE[1]

A doctrine which has been held by all geologists for a century and a half, and which has been the most important contribution of geological science to human thought. . . is that there has been an orderly succession of forms of animal and vegetable life, the evidence of which is found in the series of fossils characteristic of successive groups of stratified rocks. The theory of a progressive evolution of forms of animal and vegetable life is absolutely dependent upon the succession of fossils in the geological strata. . . .

Fossils are found almost exclusively in stratified rocks—rocks which consist of series of sheets or layers, for the most part deposited from water, though a few stratified deposits have been formed of dust or sand distributed over the land by wind. The sediments are mostly marine, though some were deposited in lakes or rivers.

In the oldest and lowest group of strata, fossils are altogether wanting, or are of obscure character. These rocks represent an age in which life was beginning, but was not yet developed into the faunas and floras characteristic of later ages. These earliest strata we may call pre-Cambrian, since the earliest group of strata showing a somewhat well-developed fauna has been named Cambrian.

The strata above these earliest rocks are divided by most geologists into ten groups, of which the first five represent the Paleozoic age, the next three the Mesozoic age, and the last two the Cenozoic age. These three ages, as implied in the etymology of the names, are respectively the ancient, middle, and modern ages of the history of life.

---

[1] From a review of George McCready Price's *The New Geology*, by William North Rice, Professor of Geology Emeritus of Wesleyan University. *Methodist Review.* 107: 556-62. July, 1924.

The strata are mostly formed of fragments, coarse or fine, of earlier rocks, which have been removed from their former position by the erosive action of atmosphere, water, or ice, and have been deposited elsewhere, after transportation for a greater or less distance. Exceptions to this general proposition are seen in limestones, which are made chiefly of pulverized shells and corals, and in beds of salt and gypsum, which are deposits from solution. The sediments are deposited chiefly in the zone of shallow water adjoining the shore. It is obvious that no sedimentary formation ever covered the whole surface of the earth. As the position of shore lines is continually changing by local subsidence or elevation, sedimentary deposits may be uplifted above the water level, and may be removed by erosion. Where an area of shallow sea bottom is gradually subsiding for a long period of time, a long series of strata may be deposited one above another; the oldest, of course, being the lowest. If such a region should be subsequently elevated, a long series of strata might be exposed to view. Each successive group of strata is marked by the presence of its characteristic assemblage of fossils; and that order is nowhere inverted. Strata of any group may be found resting upon strata of any earlier group, but never resting upon strata of any later group. To this law there are no real exceptions. A class of apparent exceptions will be considered later.

Strata are, of course, deposited in a nearly horizontal position; but subsequent movements of the crust of the globe may give them varying degrees of inclination, technically called the dip of the strata. In England which is the fatherland of stratigraphical geology, Paleozoic rocks are exposed in the northwest part of the country, considerably disturbed by crustal movements, and overlain at the southeast margin of the area by Mesozoic strata dipping gently to the southeast. A traveler journeying southeastward from the Paleozoic area will pass over outcrops of all the Mesozoic formations, which in turn are overlain by the Cenozoic. One might naturally conjecture that the older strata, which crop out in the northwest part of the country, might be found by boring at a greater or less depth in southeastern England. In recent years, the increasing demand for coal and the diminishing supply have led to experimental borings in southeastern England, and the Carboniferous formation, with coal beds, the uppermost member of the Paleozoic, has been found at the proper depth, beneath the chalk which represents the latest period of the Mesozoic. In a somewhat similar way, a traveler in New York going southwestward from the region of the Adirondacks will pass over pretty nearly the whole series of Paleozoic rocks, finding Carboniferous rocks at the surface near the Pennsylvania boundary.

We must now consider a class of phenomena which involve apparent exceptions to the proposition that the newer strata always overlie the older ones. In the great mountain chains, the strata have been very much disturbed. Mountain ranges seem to have been formed by compression of particular areas of the earth's crust, under the action of forces approximately horizontal in direction. The cause of the compressive forces it is needless for our present purpose to discuss. The effect is that the strata have been often thrown into alternating upfolds and downfolds, technically called anticlines and synclines. If the folds are nearly symmetrical, the order of superposition of the respective strata will be undisturbed, though the strata may dip more or less steeply, instead of being horizontal. In some cases, however, a strongly compressed anticline may be tipped over, so that the strata of the lower limb of the fold in inverted order underlie the strata of the upper limb which are in normal order. In other cases, the effect of the compression of the crust has been to thrust great masses of strata bodily for a distance of a number of miles over other masses of strata. In that case, on the plane along which the thrust has taken place, older strata may come to rest in nearly horizontal position on top of younger ones. In that case, however, both above and below the thrust plane, the strata will be in their normal order. These abnormalities in the position of the strata occur only where the rocks have been greatly disturbed; and in no wise disprove the doctrine of successive deposition.

THE GEOLOGIC EVIDENCE OF EVOLUTION[1]

Evolution is not a theory of origins, nor an article of scientific faith, but an indisputable fact. We could not teach geology without teaching evolution. One of the difficulties to the layman is the confusion of evolution—the record of the past and present history of organisms—with the various theories that have been proposed to explain its factors or mode of operation. Let me emphasize that evolution, the record, is in an altogether different category from the theories such as Darwinism, Lamarckianism, or any other ism that has been advanced to explain its working. You may flout all the theories or you may advocate one of a dozen different theories, but this has nothing to do with the history of life. We, in geology, spend much time in going over the history of organisms, but pay but slight attention to the theories. . . .

In approaching the geological record of evolution, I will state only facts and leave fundamental causes severely alone. The mechanism of evolution we leave to experimental biology, and I do not advocate any theories of explanation. Here is evolution. Here are the myriad of forms that moved across the stage of the past and were the actors in the drama of life. In geology, to borrow a simile from written history or philology, we are dealing with the original documents in so far as they were preserved as fossils, and in their actual order of succession.

---

[1] Excerpts from article by Edward W. Berry, Professor of Paleontology, The Johns Hopkins University. *Scientific Monthly*. 15: 97-118. August, 1922.

In approaching the geological record, the time conception is most important, and I can best illustrate this by a brief recital of the progress of knowledge concerning fossils. It is only in comparatively modern times that fossils have been recognized as the remains of animals and plants that had once been alive. The early Greeks were sane enough to recognize this apparently obvious relationship, and we find Xenophanes, 500 B.C., speculating on the fossils found in the quarries of Syracuse, Sicily. But during the middle ages there was no end to the discussion regarding the nature and ages of fossils. . . . One tells us that fossil shells were formed on the hills by the influence of the stars. Others called up a stone-making spirit. Others believed that fossils were the models made by the Creator in perfecting his handiwork before he essayed the task of making living organisms. I am quoting entirely the views of devout churchmen. Others believed that fossils were mere "figured stones," or were the abortive products of the germs of animals and plants that had lost their way in the earth, or that they were the invention of the devil to test the faith. Even after the belief that fossils were the remains of animals and plants had become well established, it was assumed that they had been killed by Noah's flood and stranded on the mountain tops—an interpretation suggested by Martin Luther in 1539 as secular proof of the correctness of the Scriptural account. This flood theory found numerous advocates throughout the seventeenth and even far into the eighteenth century. It passed through various phases of opinion. At first, the fossils were regarded as similar to those still living in the vicinity—a natural enough belief when the universal acceptance of the Mosaic cosmology and a world but six thousand years old is borne in mind. Later, when the differences in the fossils became apparent, it was assumed that they had been swept to Europe and buried by the waters of the flood and represented forms still existing in the tropics. With the progress of knowledge of tropical organisms this last view became untenable, and it was thought that the fossils represented forms that had been exterminated by the flood, and from this it was but a slight step to the once popular belief that there had been no thistles or weeds or noxious insects in the Garden of Eden, that all creation had become base with the fall of man. Gradually it came to be recognized that fossils were not only frequently unlike recent organisms, but that they were very ancient, and not merely antediluvian, but pre-Adamitic—a view first advocated by Blumenbach in 1790. We are still far from a chronolgy. Granting that fossils were the traces of once living organisms and antedated Adam—what of it? When Guettard (Jean Etienne Guettard, 1715-1786) made one of the first geological maps, it wasn't really a geological map in the modern sense, but a map of what he called mineral bands (like a modern soil map). He had no idea of geological succession or of structure. The credit of recognizing fossils as the modals of creation we owe to the genius of William Smith (1769-1839) and to the orderly arrangement of the Mesozoic rocks of the English Midlands. Smith journeyed about for years in this region, where the succession of fossiliferous strata is an open book. In his work of building canals, roads and drains, he observed that each bed contained fossils, some of which were peculiar to it, and he found that he could recognize the same horizons and the same succession at many different localities.

This important generalization has since been verified and endlessly extended. The contained fossils furnish the surest guides to the age of the sedimentary rocks that geology knows. To the biologist these facts have a deeper meaning, for they show that during the vast lapse of time, to be measured in tens or hundreds of millions of years, the living population of the globe has undergone almost continuous change, old simple forms becoming extinct, and newer, more specialized, forms taking their place, the change being, in general, from lower to higher, in other words—evolution.

That God rested from his six days' task of creation just 4004 years B.C. is so absurd that I have yet to meet a person of normal mind who believes in Archbishop Usher's chronology. There have been many attempts to determine the age of the earth in years—calculations of the rate of cooling of molten bodies, the rate of retardation by tidal friction, the thickness of the sedimentary rocks, the amount of dissolved salts added to the oceans by the rivers of the world, the condition of the radium minerals in igneous rocks. All methods contain unknown variables and are merely estimates. A favorite method has been to measure the thickness of a composite section of the sedimentary rocks, for the whole record is not complete in any one section—seas and sediments shifted with the incessant change in geographic pattern. If they had not, we should have such a perfect record of evolution with no missing chapters that we should be able to establish geological time boundaries between rock formations or biological boundaries between animal and plant groups.

The measurement of thicknesses has this advantage, that whereas its results expressed in years are not accurate, its results expressed in relative ratios of duration for the different geological periods are fairly so. I have sought to show the totality of geological time reckoned in this way in the form of the face of a clock in which the dial represents the total thickness of sedimentary rocks divided among the different geological periods in the proper ratios. With this perspective I wish to pass in review in an untechnical way some of the facts of evolution. . . .

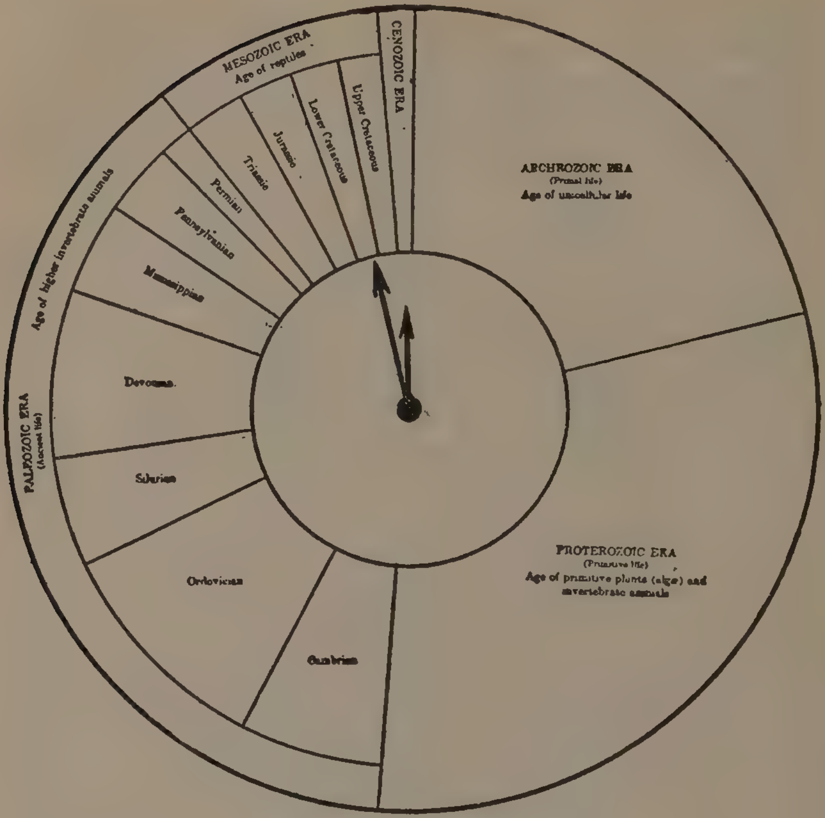


FIG. 1. GEOLOGIC TIME CLOCK

Show us one species changing into another, and we shall believe in evolution, says the bigot, expecting to see an Alice-through-the-looking-glass transformation of cats into dogs or rabbits into porcupines, not realizing what a species is, or the slowness with which very obvious new characters are acquired as measured in terms of human years. If they had been present through any seventy years of geological time, they would have seen no more evidence of evolution than they see today. The first man to see the transformation of species was Waagen, an Austrian geologist and paleontologist, who, in 1869, in the successive layers of fossiliferous Jurrassic rocks, observed the minute and inconspicuous changes of form in a definite direction, resulting as they increased in magnitude in the gradual emergence of successive new species of Ammonites (Oppelia). These observed grades of difference or nuances (Waagen termed them mutations) are the more gradual and inconspicuous the more abundant the material studied, or the finer our analysis of it. This observed gradual evolution of adaptive characters is quite the opposite of Darwin's theoretical idea of the natural selection of chance variation, and its abundant verification among all groups of fossil organisms wherever an abundance of successive faunas or floras are available for study is one of the reasons why paleontologists have never been strong Darwinists, but have emphasized the environment as the main stimulus of variation. . . . There is probably no group of organisms as ideal for evolutionary studies as are the Ammonites—extinct relatives of the pearly nautilus. Their shells are preserved in tens of thousands in the Mesozoic and earlier rocks. From the time the embryo formed its first shell until death, each successive stage is preserved in calcite within the enrolled shell. If you would see the size, form and details of ornamentation of a baby, adolescent or mature shell, all you have to do is to break away the outer shell. No other fossils furnish a complete life history with each individual. Moreover, the repetition of phylogeny during ontogeny is beautifully shown, as well as the inheritance of acquired characters, so that we know the Ammonite descent much better than we do that of many still existing groups of organisms. The main outlines of the evolution of the Cephalopods, to which group the Ammonites belong, is shown in the gradual transformation of straight camerated shells becoming curved, then loosely coiled, then tightly coiled, giving rise to forms with angulated floors to the living chamber, the parent stock waning with the rise of the daughter stock, and represented today by a single living type, the pearly nautilus. This daughter stock waxing great during Mesozoic times, we know ten thousand different species, gradually reaching overspecialization or racial senility, displayed in the progressive uncoiling and bizarre ornamentation of the shells, and finally passing off the stage altogether. A second main line of descent leads from the ancient nautilus stock in the direction of animals whose soft parts outgrew their shells, retaining them within the mantle. This second line waxed abundant during Mesozoic time, and then waned in competition with its more perfected progeny, being represented in existing oceans by the single form, Spirula, which in its extreme youth lives in a tiny chambered shell like that of its remote ancestors, but soon outgrows this shell, and for the rest of its life carries this eloquent witness of its ancestry within the hind end of its body. You might remain incredulous before a single Spirula, but when you can trace throughout the records of hundreds of thousands of years the gradual subordination and progressive decrease in relative size of the shell and increase of the soft body, the meaning is unmistakable, and to corroborate the correctness of our reading of history, we have the more modern group of squids and cuttles with all of the morphological features of the Spirula stock, which solved their problem by modifying the now useless shell into an internal axis of support and are otherwise entirely soft bodied and often of large size; and, finally, the latest evolved group—the Octopoda—smaller less active forms, having slight need for the axis of the more elongated and actively swimming squids, have lost all traces of the ancestral shell.

Another great phylum of invertebrate animals (Echinoderma) starfishes, sea urchins and crinoids, have a wonderful abundance of fossil forms and well-ascertained relationships. Their history shows a worm like ancestor developing a plated exoskeleton of many irregular pieces; the progressive reduction in number and the assumption of definite form of these pieces—the radial symmetry impressed by the habit of stalked attachment—the various lines of descent which sought to increase the food gathering mechanism by extending the parts concerned over the rest or raising them on long arms—the reversed orientation of the errant urchins and starfishes—the one time dominance of specialized crinoids—the late evolution and present abundance of the free-swimming forms with flexible skeletons—the intermediate or synthetic character of the earlier forms, especially well shown in the Ordovician to lower Carboniferous ancestors of the starfishes and serpent stars—all afford an excellent chapter in nature's record of evolution. . . .

Either these myriads of slightly differing forms in progressive or retrogressive series represent evolution, or each slightly changed faunal and floral assemblage represents an independent act of special creation. These are absolutely the only alternatives, and the advocates of special creation, little as they seem to realize it, have to assume a Creator, who every few years during a period of hundreds of millions of years mechanically fashioned new sets of organisms. Not only so, but each new set was fashioned surprisingly like their predecessors, sometimes with vestigial, useless or even harmful organs. It seems to me that this only logical application of the special creation hypothesis is a *reductio ad absurdum,* a bare statement of which is sufficient to demonstrate its obvious falsity. I would offer for the religiously inclined Henry Drummond's dictum that evolution was God's method of creation.

The complete epitome of vertebrate evolution showing the range in time and relative abundance deserves a word of comment. I should like the critics of evolution to explain why the most primitive vertebrates appear twice as far back in the record as any of the others, and why the different classes appear in the actual order from the less to the more evolved—from lower to higher—the fish-like amphibians appearing during the Devonian, the reptiles during the upper Carboniferous, and the two lines to which the latter gave rise, the mammals and birds in the upper Triassic and upper Jurassic, respectively.

Is it not most unfortunate for evolutionary sceptics that the most ancient fossil bird should be one of the best and most spectacular fossils—feathers and all preserved with great fidelity in the fine-grained lithographic stone of Solnhofen—and should represent virtually a modified and partially feathered reptile, 25 per cent reptile and 75 per cent bird. . . .

Before taking up man, I have time to consider but two among the many groups of mammals whose history is almost completely known. You doubtless think of elephants in North America only in connection with zoological gardens or circuses, and yet the elephants were a most conspicuous element of the American fauna from the middle Miocene to the end of the Pleistocene, and numerous bones and teeth have been found here in Maryland. They lived in America much longer than has the human race and much longer than the bears which we commonly think of as characteristically American. The elephants were originally immigrants from the old world. They occupy today a somewhat isolated position among hoofed mammals and display a curious but readily understandable mixture of specialized and primitive characters. Their specializations are in head and teeth, their conservatism is in body and limbs. To understand their ancestry, we must understand the five or six African and Asian species of the present. Their most obvious feature is the long trunk or proboscis that gives the name proboscidia to the order. This trunk is simply an elongated nose, although it did not come into existence in the way Kipling relates. Aside from the trunk the tusks mark the elephant. These are simply much modified upper incisor teeth. . . .

The earliest known fossil elephant, only a potential elephant, was of upper Eocene age and comes from near Lake Moeris in the Fayûm, and was consequently christened Moeritherium. It was small and somewhat suggestive of a tapir. The skull was long and narrow, the trunk was merely a snout, the neck was moderately long and the limbs were slender. The teeth were the most significant feature. First upper incisor was small and simple, the second was a downwardly directed small tusk. The third and the canine were non-functional and there were six grinders, simple and quadritubercular (four cusps and two crests). In the lower jaw the incisors were procumbent. The first long, the second an enamelled tusk with worn chisel edge; the third and canine already gone and six grinders. The second stage of elephant evolution was Palæomastodon of the lower Oligocene of the same region. Several species are known, ranging in size from that of a modern tapir to a half grown Indian elephant. Canines have gone; the incisors are reduced to a single tusk in each jaw ramus, *i.e.*, two upper and two lower tusks. All the grinders are functional, but they have increased in complexity and now consist of six cusps and three crests. The trunk was still short, the head still long and narrow, the limbs heavier, but still relatively light. The elephants now spread into southern Asia and over Europe during the lower Miocene, giving rise to various collateral lines of evolution along their different routes of dispersal. They increased greatly in size and became more elephantine in appearance. They reached North America during the middle Miocene, and these four-tusked forms spread from Nebraska to Florida. The old-world stock shortened the chin and lost the lower pair of tusks during the Pliocene, giving rise to the mastodons and mammoths of the late Pliocene and Pleistocene, which reinvaded North America and ranged southward to the straits of Magellan. Our mastodon survived much later than the European mastodon, and the males sometimes show vestigial tusks in the lower jaw. The mammoth was the contemporary of early man in Europe as the many excellent carvings of the stone age show, and probably also in North America, as somewhat vaguely pictured carved bone and associated flints indicate. They were so common over the northern hemisphere at that time that we have records of 1,635 fossil tusks, averaging one hundred and fifty pounds, being exported from Siberia in a single year. Between 1820 and 1833, trawlers out of Happisburg, Norfolk, dredged two thousand elephant molars from the submerged old land of the North Sea. (We had three true elephants in America during the Pleistocene—the northern or hairy mammoth, the southern or Columbian mammoth, and the imperial mammoth, the latter standing thirteen feet at the shoulder.)

The family tree of our noblest of domesticated animals—the horse—has been called the example *de luxe* of evolution, since no animal stock is more completely known or has a more spectacular history. Long domesticated the modern animal is found almost everywhere that man can live, and of many breeds. As wild animals, horses are found only in the old world in modern times—the arid plains of central Asia and Africa. There are several species—horses, asses, zebras and quaggas—very uniform in tooth and skeletal characters, but strikingly different in appearance, because of the superficial difference in coloration and in the development of forelock, mane, tail and ears. They differ from all living animals in having a single toe on each foot. Their remotest ancestors were small five-toed plantigrade animals as were all of the earliest mammals. Hosts of fossil species are known, some extinct side lines especially adapted to certain environments, like the small mountain horses or the forest-dwelling and softer ground-inhabiting forms. Others were a part of the progressive line. The earliest known fossil horse you would not recognize as a horse. How do we know it was? By tracing backward step by step from the known. Nearly every stage of this ancestry is now complete, and we are as certain of the remote Tertiary form as we are of the present cart horse. The earliest well-known ancestral horse is the tiny Eohippus or dawn horse of our early Eocene. It was about the size of a fox terrier, *i.e.*, eleven to fourteen inches high, with a short neck, long body, arched back, short legs and small teeth. The front feet had four functional toes, and a splint representing the first or thumb. The hind feet had three functional and two splints representing the first and fifth. It is significant that at that time the ancestral horse line is so generalized that a layman could not distinguish it from the contemporaneous ancestral rhinoceroses or tapirs.

The second-stage Protorohippus of the middle Eocene was about the size and proportions of a whippet hound. The thumb splint had now disappeared from the front foot, and the little finger splint from the hind foot. The weight was beginning to center on the middle toe, but it required two or three million years more to completely suppress the lateral toes. If there were time, we might pass in review each stage of horse evolution—the Epihippus of the upper Eocene, the Mesohippus of the Oligocene, about the size of a sheep, the Miocene, Protohippus, Pliohippus, Neohipparion, etc. The upper Miocene Protohippus is in the direct line and may be briefly characterized. About forty inches high, longer head, longer teeth, deeper jaws, shortened body, longer legs and feet, only the third toe normally reaching the ground, but the second and fourth were complete "dew claws" and helped to support the weight on soft ground. There were many varieties of three-toed horses, and in the late Tertiary they had spread pretty well over the world, being found in South America, Europe and Asia, as well as in North America. By Pleistocene time the horses had become monodactyl, varied, abundant and wide ranging. So countless were the herds that the Sheridan formation of the west was long known as the Equus beds from the abundance of their fossil remains. When, however, America was discovered, horses had become extinct in the western hemisphere as well as in native tradition, although their bones are found associated with flint implements, pottery and fire refuse. They appear to have first been domesticated during the Neolithic, that is about 7000 B.C. in Europe, but probably at a much earlier date in Asia. Our modern work horse is descended directly from the European Neolithic horse, which was much like the Celtic pony. Descendants of this low-bred primitive race were distributed over Eurasia, where they are still represented by the Norwegian and Mongolian ponies. All the earlier horses of written history belonged to this type. It was improved by importations from Libya—the Arabs, for example, getting stallions and brood mares from Barbary, where the stock had suffered no ill effects during the Pleistocene glaciation, there having been no severity of climate in northern Africa. The course of evolution in the horses was not confined to the feet. It may be summarized as follows:

Along with the disappearance of side toes went increase in length of leg and foot, especially the distal portion. Increased length of the lower leg and foot increased length of stride and, as the chief muscles are in the upper leg, the center of gravity was changed very little, consequently the swing was about as rapid but mechanical strain was greatly increased, so that strengthening at the expense of flexibility by consolidation of the lower leg and arm bones and conversion of ball and socket into pulley joints (ginglymoid) occurred. Lengthening of limbs for speed in grazing animals necessitates lengthening of the neck. Loss of toes was a hard ground adaptation for speed. The lengthening of the teeth which caused the deepening of the jaws was an adaptation for hard food and ensured more thorough mastication and a longer life span. Increase in size, although demanding an increased food supply, is a better defence against enemies or competitors. The evolution of the horse was from forest and swamp to grassy plains and went hand in hand with the evolution of the environment. Since monkeys are unaccountably not fashionable and we are very fond of horses here in Maryland, I show you for comparison a skeleton of a modern horse and man. Not only in the structure of all his physical parts, bone for bone, muscle for muscle, and nerve for nerve, is man fundamentally like the other mammals, but his specific organic functions are identical. We have the same diseases; we are similarly affected by the same drugs—in fact the whole wonderful advance of physiology and experimental medicine is built up on this truism. Have you ever thought of the countless generations of meat-eating humans involved in the specialization of the two human tape worms—the one passing its intermediate stage in beef and the other in pork and of which man alone is the host of the adult stage. The pre-humans were not meat-eaters, and we should not fail to take into account the improvement in nutrition in shortening the digestive processes and the stimulating properties of the proteins and their split products that a change in diet gave our ancestors the energy for other things.

I have already mentioned the remoteness of man's relationship with the existing monkeys and apes. Unfortunately, we have but slight knowledge of the earlier stages which remain hidden in the unexplored regions of Asia and Africa, to which much evidence points as the original homes of a majority of the mammalian stocks that appeared in Europe and North America during the Tertiary. But we know much of our less remote fossil ancestors. Evidences of their slowly advancing skill in the fashioning of weapons and implements, in the discovery of the bow and the uses of fire are innumerable, and their skeletal remains are found over a period estimated at from two hundred and fifty thousand to over a million years. We know at least two, perhaps three extinct genera of men and at least five distinct human species. All the existing races of man—white, black, red and yellow—belong to the single zoological species which we modestly call *Homo sapiens*. I should say that our knowledge of the exact stages between non-human ape-like animals and man is as complete as was the knowledge of the evolution of the horse at the time of the founding of this university when Huxley lectured on the evolution of the horse. At the present rate of discovery (Piltdown man in 1911, Foxhall man in 1919 and Broken Hill man in 1920), another generation will not pass before the story is complete.

Before relating what we now know of this story, I should like to refer to how we arrive at estimates of age in this part of the geological column—estimates which are as exact as the earlier dates of what is called the historic period. During geologic time immediately preceding the present there is conclusive evidence of a mantle of ice spreading over northwestern Europe and northern North America. This was not a single episode but a long enduring succession of glacial stages and milder interglacial stages—some of which were much longer than the time that has elapsed since the last ice sheet shrunk away from the Baltic or from the valley of the St. Lawrence. Naturally the deposits and moraines of the last ice sheet are fresher and less disturbed than the similar traces of the earlier ice sheets. By counting the annual layers in the clays in the wake of the shrinking ice of the last glaciation, we can trace and date its gradual withdrawal from the plains of Germany across the Baltic to the Scandinavian uplands, and the more broken clay layers in the valleys of the Connecticut, Hudson and Champlain give the story for this country. Using this period of time as a unit, we calculate from a variety of criteria the duration of the earlier glacial and interglacial stages. The oldest known man-like animal comes from distant Java and dates from the beginning of the Pleistocene, or from two hundred and fifty thousand to one million years ago, or more precisely, twenty-five times as long ago as the interval since the last ice sheet extended across Long and Staten Islands here in the eastern United States. Evidence of human, or if you prefer so to call it, pre-human, industry in the form of rudely chipped flints and a knowledge of fire occur still earlier, and if the recent discovery of the Foxhall man in East

Anglia is properly dated, we shall have unmistakable evidence of man in the late Pliocene. Our knowledge of the ape-man of Java is on a sounder footing. First of all, he came from Asia along with the greater part of the considerable variety of animals and plants that are found fossil with him. The motive power was the less hospitable climates in Asia resulting from the gradual uplifting of its great mountain areas in the late Tertiary, The fauna and flora including the ape-man drifted to the southeast down the broad valleys that at that time of emergence made a single land mass of the Malayan region. The anatomical features of the ape-man are technical. Our interest centers on the brain case and the fact that he was a ground inhabiting biped and not arboreal. The cranial capacity has been variously estimated between 850 and 950 cc as compared with 1,300 to 1,700 of the Neanderthal man of the third interglacial period, or 650 cc, the greatest ape brain in the gorilla, which has twice the body weight of a man. The lower frontal lobe region of this brain case shows conclusively that Pithecanthropus possessed speech—not sounds or signals expressive of emotional states, but that he was capable of transmitting ideas and information.

THE EVOLUTION OF MAN[1]

Anthropologists accept evolution as the most satisfactory explanation of the observed facts relating to the universe, to our world and all life on it. They hold that the evidence abundantly justifies us in believing that development has been from the simple to the complex and that present forms of life, including man, have been produced from earlier existing forms, but through immense periods of time.

The field of the anthopologist is man, man's body and man's society, and in this study he finds himself working side by side with the biologist and the geologist.

---

[1] By Dr. Fay-Cooper Cole, professional lecturer on Anthropology, University of Chicago. *Scientific Monthly.* 21: 317-22. September, 1925.

For the study of man's body he has worked out a set of instruments and has selected a series of points for observation, by means of which he can accurately describe each individual of a group, the length, breadth and height of head, the facial proportions, the length of limbs and so on.

In this way the anthropologist determines the average of a group or tribe or race, and is able to determine its normal variation. Anything strikingly beyond the normal at once becomes the subject of inquiry to determine its cause. In addition to the mathematical description there are added observations—color of skin, shape of teeth, the form of the hair and many others.

On man's skeleton these observations are even more exact and are so definite that given a single skull or skeleton it is possible to tell with considerable certainty the age, sex, and race of the individual, while for a series of skeletons, the results are definite. The skeletons tell much of man's history, for the articulation of the bones and the lines of attachment of the muscles reveal how he walked, how he held his head and many other details of his life. It also reveals the fact that man presents many variations difficult to explain without referring to similar conditions found in the animal world. To gain further light on these variations the anthropologist works with the anatomist and comparative anatomist and he quickly finds that every human being of today possesses many muscles for which there is no apparent use, such muscles as those behind the ears, those going to the tail, the platysma—a muscle going from the chin to the clavicle. These are but a few among many which today are functionless in man, but are still in use by certain animals. Going to the human embryo we find these vestiges of an earlier condition much more developed, while others appear for a time and then vanish before birth. Such a case is the free tail possessed by every human embryo a few weeks before its birth.

It is difficult to explain the presence of these useless organs in man unless we believe that some time in his development they were in use.

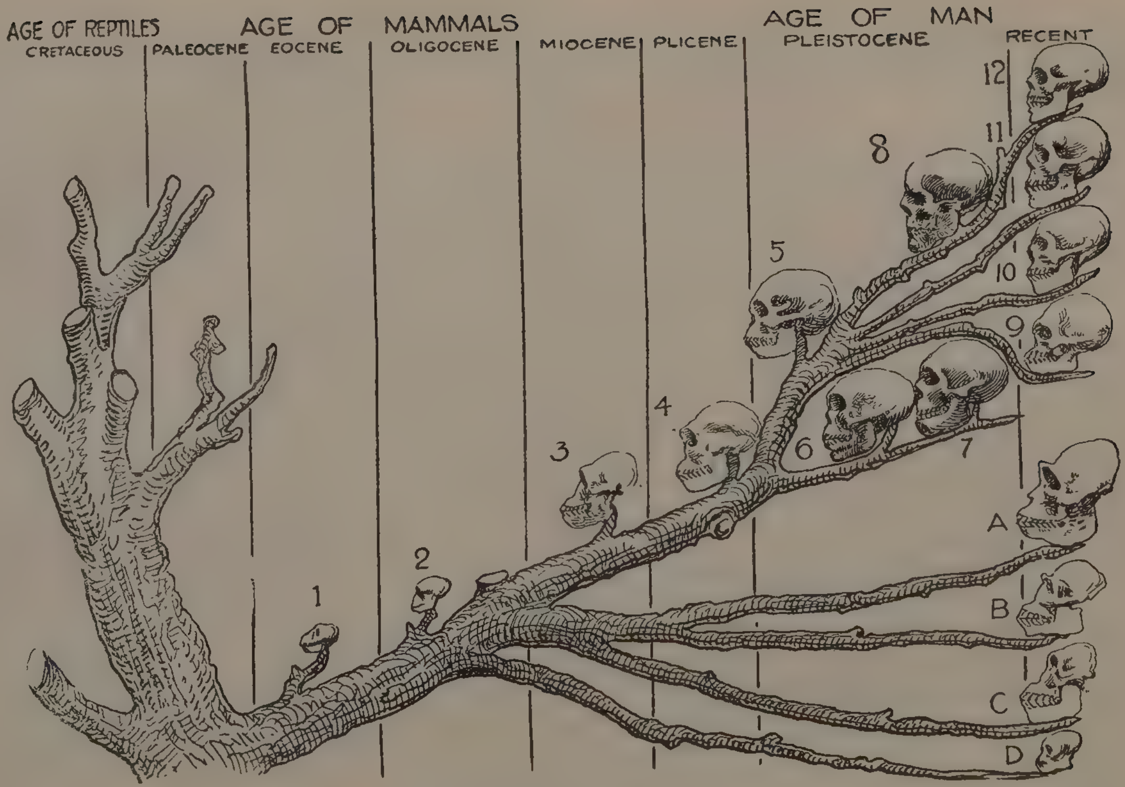
This study also reveals the fact that man closely resembles certain members of the animal world in every bone and organ of his body. There are differences, but they are differences of degree rather than of kind. Those animals most closely resembling man are the anthropoid apes. A careful study shows that they have specialized in their way quite as much as man has in his, so that while they are very similar, yet it is evidence that man's line of descent is not through any of these anthropoids. It does appear, however, that both man and the other primates have a common precursor, but that the anthropoids must have branched off from the common stock in very remote times. If this is true, then we might hope to find in ancient strata of the rocks some evidences of earlier forms of men, who might perhaps more closely approach the common ancestor. This is exactly the case. The geologists have established the relative age of the strata of the rocks, while the paleontologists have made plain the forms of life which lived in the epochs when these strata were deposited.

EXTINCT RACES OF APE-LIKE MAN[1]

In order to connect the evolution of the human species with the earliest forms of life it is necessary to begin long before the apes and men had evolved from the general mammalian stem. It is highly difficult to be specific about the age of the original mammal, but we can say that mammals were beginning to develop from an earlier form within something like fifteen million years ago. It may have been more, and was hardly less, although it is very difficult to get geologists to commit themselves within a few millions of years in these matters. At that time, in the Cretaceous period, the domi-

---

[1] From *Scientific American.* 128: 302-3. May, 1923.



THE PROGRESS OF EVOLUTION

Reproduced from the Pathfinder, September 26, 1925, by permission of The Pathfinder Publishing Co., Inc., Washington, D. C.

nant life of the world was reptilian. The mammals were as yet of little importance. They were not to gain much headway until about five million years ago, in the Eocene epoch of the Tertiary period, Cenozoic era, when the mammoth reptiles we see in museums, such as the brontosaurus and diplodocus, had become extinct. . . . At the time the mammal had not yet divided and subdivided into the hundreds of species now extant.

The Eocene epoch finds the mammals increasing in numbers and in species. They throve and dominated the earth, just as they do today—in fact, a little more so, for a number have since become extinct. A complete Eocene family tree of the mammals would have hundreds of branches, but we are forced to drop, from now on, all but one—that of the higher primates. These primates include the monkeys, the lemurs, the apes, the man-like apes, the ape-like men, and man. The monkeys are not shown on the tree, but they split off during these times, and from now on we are through with the monkeys, as well as the word "monkeys." We shall frequently deal with the orang-utan, chimpanzee and gorilla, but these are apes, not monkeys. To say that "man descended from monkeys" is untrue. But it is accurate to say that man and monkeys, as well as the apes, both descended from a common stock. Also it must be remembered that this stock was not monkeys as we know them when we see an Italian organ grinder with one, but that the monkey has evolved and changed in one direction, just as man has changed in another. We are collateral species, the ape being our first cousins, as it were, the monkey's first cousins once removed, and the dog, horse, or the seal, for instance, being "second cousins."

Propliopithecus of the Oligocene epoch of our tree is the name assigned to a very primitive anthropoid or "man-formed" ape which is sometimes regarded as a possible ancestor of all the apes and man. The gibbon is an offshoot from this time. Instead of becoming partly erect, the gibbon has gone down on all four limbs and has developed an appearance somewhat like that of a dog, though the resemblance is, of course, accidental. Propliopithecus was a comparatively small animal which lived among the trees and may have resembled the gibbon in some respects.

The Miocene epoch began about two million years ago and brought mammalian development to its culmination. The many mammals which had been evolving through the Eocene epoch had become more settled in form. Sivapithecus was an early ape whose fossil bones have been found in India. He presents elementary manlike characteristics, but he is still an ape. Man, with his much better developed brain, was yet to come. From creatures like Sivapithecus descended the orang, the chimpanzee, the gorilla and man. The orang is the older offshoot of the three apes. The gorilla resembles the chimpanzee more that he does the orang.

We must, then, trace our genealogy and that of the apes back about two million years before we come to a common meeting point with the ancestor of the apes, while our separation from the monkeys is one or two millions of years greater. While the geologist is unwilling to be dogmatic in assigning definite values to the lengths of the epochs, knowing that such figures are only roughly approximate and may be altered by later discoveries, the average reader wants some statement more definite, more tangible than "a long time ago," and for this reason, figures which may later be shown to be as much as 50 or more per cent out of the way, are chosen from the average of many opinions. It has been the usual experience that such figures, when revised, have been added to rather than reduced.

Having eliminated from our tree the apes, the real "study of man" or anthropology, begins with the latter part of the Pliocene epoch, the epoch immediately preceding the glacial epoch. Pithecanthropus was the Trinil man of Java. We believe he was not an ape but a man. Of course there is a place where it is hard to draw the line, yet his skull, which was found in Java, has capacity for a good enough brain to be that of a very primitive man. . . . We do not know much about the life of this creature. Flints which were found in the same stratum with him might have been very crude implements, or simply stones having the appearance of implements. This "walking ape-man" may have used these stones simply to smash nuts, macerate his food or to hurl at the creatures he wished to kill for food. From the bone structure of his skull we can tell that the Java ape-man walked comparatively upright, and, therefore, we know that he had the free use of his forelimbs. This brings us to a pronounced turning point in man's evolution. When the forelegs were freed from walking they are ready to be made into hands. Unconsciously the animal comes to use them more and more for grasping. This soon leads to holding, manipulating and examining things. In this process the brain is developed. Next, the improved brain reacts on the hands, they become more useful, learning to turn things so that they may be critically examined before the eyes. The eyes and observational power share in the improvement. The brain, the hand and the eyes interact and evolve in a sort of geometric progression. Evolution is thus speeded up many fold. Soon, implements are used, a use probably first discovered accidentally. Gradually the thumb, which has been heretofore one of a row of fingers, evolves around into a position opposite the fingers. Then the creature is vastly better able to perform careful work with his hands. Let the reader attempt some operation, such, for instance, as climbing a tree, with the thumb held alongside the fingers. It was the use of his forelimbs for hands that put man so far in advance of the rest of the animals that they were hopelessly outdistanced.

Our pursuit of the early man now takes us into the great glacial epoch, called the Pleistocene. The total duration of this epoch was probably about four hundred thousand years, and the subsequent time up till today was about thirty thousand years. The real development of man was contemporaneous with the glacial epoch, and was so tied up with its several phases, that it is necessary to stop and learn a few salient facts concerning it. The ice age has seven subdivisions, four representing the four separate invasions and retreats of the great northern icecaps, the remaining three representing the intervals between these invasions. These are termed the first, second, third and fourth glacials; and the first, second and third interglacials, respectively. The glacials are regarded as having been twenty-five thousand years each, the interglacials were about seventy-five thousand, two hundred thousand and one hundred thousand years each, respectively. Therefore the sequence would be something like this:

1st Glacial 25,000 years
1st Interglacial 75,000 years (warm)
2nd Glacial 25,000 years
2nd Interglacial 200,000 years (warm)
3rd Glacial 25,000 years
3rd Interglacial 100,000 years (warm)
4th Glacial 25,000 years
Postglacial time 30,000 years (warm).

These eight periods of time are constantly used by anthropologists as chronometers because the fossils of most of the archaic men are found in connection with glacial and interglacial deposits of detritus. These deposits can quite easily be placed in their proper sequence and dated with fair accuracy, and it is by this means that the antiquity of the Old Stone Age races may be calculated.

Now as we look back through all this alternation of frigidness and warmth, ice and vegetation, south polar conditions and conditions bringing back the climate, say, of Spain, we are apt to ask, "Is it not remarkable that man could have had his most phenomenal development from the near beast to the level of the average European during so confused, erratic, unstable a time?" The answer is, first, that the interglacial times were very long, even though they are foreshortened by the perspective of time; and, second, that the great, deep icecap did not extend south of central Europe, and so man was doubtless continuously evolving in other places, only the individuals living within a few hundred miles of the ice-edge even knowing the ice existed. It so happens that we have been able to recover evidence of the latter, but not as yet of the former man. The ice won its way against the diminishing heat of the sun during not one, nor a few, but scores of generations, and when the interglacials gradually came on, the process was reversed. No one man followed the ice-edge back. His great-grandchild might have found it further back by a mile or two, but if so, he did not know it was retreating. Through such gradual transitions man had little trouble in establishing himself, by adaptation, to his environments.

Heidelberg man and Neanderthal man represent a branch of the tree which finally became extinct. Yet this branch of man lived during more than two hundred thousand years, leaving us many remains of his culture and fossils of himself. All we have of Heidelberg man is a single jawbone. . . . The narrow space between the sides of the jaw could hardly have given space enough for a mobile tongue. If Heidelberg man spoke, it must have been by means of grunts and other crude noises. This jawbone is very large, and is ample evidence, coupled with the fact that the stone implements found in the same stratum are so heavy that no modern man would find them easy tools to work with, that Heidelberg man was a great, powerful brute of a fellow, with massive forearms.

There are reasons for believing that Neanderthal man, if not directly descended from the Heidelberg man of two hundred thousand years previous, did have his descent from a very similar being. Neanderthal man appears in Europe chiefly as a cave dweller. He is the original "cave man." The advancing ice, chilling the climate of Europe, drove him into the limestone caves of the hills. There he seems to have existed during the whole of the fourth or last glacial period, sallying out to hunt the reindeer and little wild horse for food, stripping the flesh from the bones, and bringing the larger bones to his retreat to be split open for the succulent marrow. Although he was a man, he was not like homo sapiens (which is us) in many ways. He was lower than any human race now living, although his brain, as measured by the capacity of his skull, was not greatly smaller than those of our living lower races. He was a great, chesty creature somewhat like a professional wrestler in this particular, with thick short neck, massive head and powerful arms. The articulation of his skeletons, of which many have been found, shows that he did not habitually hold his head upright, but rather that it was bent well forward, throwing his eyes on the ground. His forehead sloped quite sharply back, his brows stood out prominently, and his chin was entirely lacking, like that of an ape. But his nose appears to have been high, almost aquiline, unlike those of the more primitive modern races. He must have presented a truly forbidding appearance to the more advanced Crô-Magnon race which was destined to overwhelm and exterminate him. For the cave man came to an abrupt end some twenty-five thousand years ago. He was an experiment that failed. A more intelligent race took his place.

Following back our diagram, we come to Eoanthropus. This is the name of the Piltdown man. The Piltdown man was discovered in England in 1911, not in caves, but in gravels. Only a single specimen has been found, and the jaw of this specimen remains doubtful. It was found at a distance of three feet from the skull and may have been that of a chimpanzee. Therefore there has been much discussion over Eoanthropus. The skull itself is a very primitive sort with remarkably thick walls. Eoanthropus means "dawn man" and he is placed on the scale of intelligence where the ape has become a man, perhaps one hundred and twenty-five thousand years ago.

Not long after this it is believed the black and yellow races branched off. The state of opinion concerning them is too unsettled to warrant drawing definite conclusions. Of course, they have each been evolving along with the white race.

Finally we come to the Pleistocene Crô-Magnon man, of whom we know more than of any of the early races so far discussed. The Crô-Magnon was the equal of any of the human races of today. As the climate of Europe became more temperate at the close of the glacial period we find this race infiltering into Europe and displacing the Neanderthalers. He brought with him an already developed culture that indicates a long period of time spent elsewhere in evolving from some unknown, early branch of our great family tree which we are unable to supply. He was a big, tall fellow, many of the skeletons measuring six feet four inches. Otherwise there was nothing of the uncouth, animal appearance of Neanderthal man about him. The most marked peculiarity was a great width across his face at the cheek-bones, but his skeleton is constructed very much like those of modern men.

The Crô-Magnons took over the same caves they had won from the Neanderthalers, and thus in France, Spain and Germany we are able to find many of the remains of their culture. Their weapons and implements of unpolished stone are found mixed with the debris of bones and trash that would accumulate in the cave habitation of a primitive people, and many cave burials of these people themselves have been located, the skeletons often being practically intact. The ice of the great glacial cap had too recently retreated to permit of the reforestation of the landscape, so we find that these new peoples were hunting their game on the steppes, pursuing the same wild horses and reindeer their cave man predecessors have lived upon. The Crô-Magnons are the "reindeer man" we so often read of, although they, too, lived in caves. They were artists, scratching crude drawings of animals on pieces of bone, and sometimes making quite remarkably good drawings on the walls of their caves with various natural pigments, such as red and yellow ocher. These usually depicted the animals that so fully filled the horizons of a hunting people—the bear, the reindeer, the auroches and the bison. Some of the figures are about on a par with those of animals drawn by clever children, or by the average adult.

It is believed that the present peoples of Europe represent two invasions. First came the Mediterranean stock, having heads which, if viewed from above, would be called long. Later came the Alpine stock, with broad heads. Both may have come from Asia, or the long head may have come from northern Africa. They came fully evolved in body and in culture. Using weapons of polished instead of rough stone, they are the first European men of the New Stone Age. Who were their ancestors? Of this we know nothing. Anthropologists have been in the position, rather illogically, but as yet unavoidable, of studying other races without having an opportunity to study our own. In other words, we do not know anything of the whole course of evolution that connects our own white race back to the early primate stem. The records probably lie in the soil of southern Asia and we have not yet got at them. The reasons for this are very practical, every-day sort of reasons, not the least of which has been the lack of money for this purpose. The results of the few expeditions that have been sent out have been meager because there is such an immense area to hunt over; because it is so far from the centers of civilization; because of the climates and half-wild tribesmen of many of the regions suspected of holding the secrets of the evolution of modern man; and, lastly, because, compared to the results to be obtained from archæological expeditions in Egypt and Assyria, there is little that is spectacular and tangible enough to the average person with means to interest him in this long search. . . .

NEW LIGHT ON EVOLUTION[1]

A four-year-old child is now the center of attention in the scientific world. Emerging from the darkness that preceded man's dawn, this age-old youngster may hold within its few mortal remains the secret of one step in man's evolution. The child has been named *Australopithecus Africanus,* after the land of its birth and death. Preserved within a bed of limestone, fifty feet beneath the surface and two hundred feet within a hill horizontally, at a place called Taungs, Bechuanaland, South Africa, a childish fossil face and childish fossil brain have been found. For hundreds of thousands of years, probably, these relics had been preserved by nature. A quarryman blasted them out and Professor Raymond A. Dart, anatomist at Witwatersrand University, Johannesburg, saw their significance.

The skeletal remains of *Australopithecus Africanus* as described by Professor Dart consist of two fragments. One is the complete cast of the interior of the cranium. The other is the face of the skull. Both were found imbedded in the limestone of an old cavern, completely filled with bedded sand infiltrated with lime. The skull is dolichocephalic, long and narrow and somewhat oblong in shape, while the face is leptoprosopic, relatively long and narrow. The first permanent molars of the child have just erupted. The brain has a size just slightly larger than that of an adult chimpanzee. One of the convolutions of the brain, the lunar fissure, has a position approaching the same feature in the human being. Another humanlike feature is the fact that the muscles of the jaw at the stage of evolution shown by the skull had decreased in size, due to lack of hard usage, so as to allow the brain in the region of the temples to bulge out. In contrast with the apes, ridges above the eye orbits of the skull are absent. The eye orbits are rounded, and the nose bones terminate above the line connecting the lower margins of the eye orbits. This is humanlike. The setting for the teeth is more nearly human than that of the apes. The lower jaw resembles in its front portion the famous Heidelberg jaw. Another point of importance showing the jaw's close approach to human characteristics is the lack of a simian shelf, a ledge on the interior of the lower jaw present in the apes. The canines of the jaws are small and lie in line with the slightly crowded vertical front teeth. The foramen magnum, the hole through which the spinal cord enters the brain, is placed well forward. In the monkeys this is well to the rear of the skull, and its location in the newly found skull indicates that the creature to whom it belonged may have walked upright. The specimens are diagnosed by Professor Dart as those of a man-like or anthropoid ape and classified as a new family, the *Homosimiidae.*

---

[1] By Watson Davis, managing editor, Science Service. *Current History, New York Times.* 22: 93-5. April, 1925.

The fact that the skull was so young when its owner met death is a disadvantage from the standpoint of anthropological study, for the skull of a young ape has more human characteristics than the skull of an adult ape. Yet there seems to be little doubt that there has been discovered a most important step in the evolutionary history of anthropoids, if not man, who arose from the same stock as the present apes.

The present discovery by Professor Dart takes on added interest because of the very primitive skull found some three years ago in the course of mining operations at Broken Hill in Northern Rhodesia, South Africa. A cast of this famous skull has just been presented to the Smithsonian Institution by the British Museum of Natural History and Dr. Ales Hrdlicka of the United States National Museum characterizes it as "most puzzling." With features that are so old that they date back to the middle of the glacial period, this skull was found associated with the bones of animals still living in Africa. Yet no race of man now living on earth could be the progeny of this strange Rhodesian man, Dr. Hrdlicka declares; even the primitive negro is quite different and far removed from this earlier African inhabitant.

EVIDENCES FROM COMPARATIVE ANATOMY[1]

The foundation stones of comparative anatomy are the principles of homology and of analogy. The former implies heredity and the latter variation.

The Principle of Homology

Any one who has at all seriously studied comparative anatomy must have been impressed with the fact that the animal kingdom exhibits several distinct main types of architecture, each of which characterizes one of the grand divisions of the kingdom. Within each of these great assemblages of animals characterized by a common plan of organization there are almost innumerable structural diversities within the scope of the fundamental plan. These major or minor departures from the ideally generalized condition remind one of variations upon a theme in music; no matter how elaborate the variation may be, the skilled musician recognizes the common theme running through it all. This fundamental unity amid minor diversity of form or of function is looked upon as a common inheritance from a more or less remote ancestor. In animals belonging to the same group and, therefore, having the same general plan of organization we find many organs having the same embryonic origin and the same general relations to other structures, but with vastly different superficial appearance and playing quite diverse functional roles. Such structures are said to be homologous.

---

[1] By Dr. H. H. Newman, Professor of Zoology, University of Chicago. *Scientific Monthly.* 21: 302-9. September, 1925.

A common example of homologous structures is presented by the fore limbs of various types of backboned animals (vertebrates): such, for example, as that of man, that of the whale, that of the bird and that of the horse. The arm of man is by far the most generalized of these; it is not far from the ideal prototypic land vertebrate fore limb, in that it is not specialized for any particular function but is a versatile tool of the brain. The flipper of the whale is a short, broad, paddle-like structure, apparently without digits, wrist, fore arm or upper arm: but on close examination it is seen to possess all these structures in a condition homologous almost bone for bone and muscle for muscle with those of the human arm. The wing of a bird, a highly specialized organ of flight, appears superficially to have nothing in common with the arm of a man; but a study of its anatomy shows the same bony architecture and muscle complex, modified rather profoundly for a different function and with the thumb and two of the fingers greatly reduced or entirely unrepresented in the adult stage. The fore leg of the horse is a specialized cursorial appendage, and in accord with this function has but one functional toe with a heavy toe-nail or hoof. Two other toes are represented by the so-called splint bones, mere vestiges of once useful structures. In other respects the horse's leg is quite homologous with that of other land vertebrates. The evolutionary explantion of the fact that these several types of limbs (each playing an entirely different role in nature and each so unlike the other in form and proportions) have the same fundamental architecture is that they have all inherited these characters from some distant common ancestor. In each case the inheritance has undergone modification in harmony with the life needs of the organism. This, of course, implies descent with modification, which is no more or less than evolution.

An equally significant situation comes to light in connection with the hind limbs of vertebrates. The leg of man, a specialized walking appendage, is much less versatile than is the arm, yet it is closely homologous with the latter. The hind limb of the whale is in some species entirely wanting in the adult or else is in vestigial condition. The leg of the bird is decidedly reptilian in structure and is believed to have retained in large measure the characteristics of that of the supposed reptilian ancestors. The hind limb of the horse, though somewhat stronger and heavier than the fore limb, resembles the latter closely both in form and function. Snakes are typically limbless vertebrates, but the python has small but clearly defined hind limbs, somewhat reduced in number of bones and almost entirely hidden beneath the scaly integument.

No other attempt to explain homologies such as those briefly outlined above has been made except that of special creation, and this implies a slavish adherence to a preconceived ideal plan together with capricious departures from the plan in various instances. A systematic attempt to apply the special creation concept to all cases of homologies involves one in the utmost confusion of ideas and leads almost inevitably to irreverence, which is abhorent to the evolutionist as well as to the special creationist.

VESTIGAL STRUCTURES

These may be defined as functionless rudiments of structures whose homologues are found in a functional state in other members of a group with a common architectural plan. Thus the hind limbs of the whale and of the python, the thumb of the bird, the splint bones of the horse, are vestigial homologues of structures well developed in more generalized groups of vertebrates.

The case of the hind limb vestiges in the various species of whales may be emphasized as a crucial one. Several different degrees of rudimentation are found in different types of whales, ranging from a state in which the pelvic bones and those of most of the leg are clearly recognizable as such down to one in which these bones are entirely absent in the adult condition. In the cases where the bones are obvious, the situation is just this: deeply buried beneath the thick cushion of blubber in the pelvic region there lies a little handful of bones, ridiculously minute in comparison with the giant proportions of the other parts of the skeleton. These bones are immovable because their muscular connections are atrophied; they do no service in supporting the frame of the animal; in short, they cannot possibly function as bones at all. The somewhat puerile argument of the anti-evolutionist that these vestigial limb bones play some useful though unknown role, else they would never have been created, cannot seriously be entertained in this case, for what can they make of the fact that some whales entirely lack these structures? More difficult even than this for the special creationist to explain is the fact that, even in those whales that lack vestigial limb bones in the adult condition, posterior limb buds appear in the early embryonic period and then slowly atrophy. The case just described is in no way exceptional or peculiar. It is, on the contrary, quite typical of a very general phenomenon.

Vestigial Structures in Man

There are, according to Wiedersheim, no less than one hundred and eighty vestigial structures in the human body, sufficient to make of a man a veritable walking museum of antiquities. Among these are: the vermiform appendix; the abbreviated tail with its set of caudal muscles; a complicated set of muscles homologous with those employed by other animals for moving their ears, but practically functionless in all but a very few men; a complete equipment of scalp muscles used by other animals for erecting the hair but of very doubtful utility in man even in the rare instances when they function voluntarily; gill slits in the embryo, the homologues of which are used in aquatic respiration; miniature third eyelids (nictitating membranes), functional in all reptiles and birds, greatly reduced or vestigial in all mammals; the lanugo, a complete coating of embryonic down or hair, which disappears long before birth and can hardly serve any useful function while it lasts. These and numerous other structures of the same sort can be reasonably interpreted as evidence that man has descended from ancestors in which these organs were functional. Man has never completely lost these characters; he continues to inherit them, though he no longer has any use for them. Heredity is stubborn and tenacious, clinging persistently to vestiges of all that the race has once possessed, though chiefly concerned in bringing to perfection the more recent adaptive features of the race.

Homology Versus Analogy

It is quite common to find different animals with certain structures that look alike and function alike but are not homologous. The eye of the octopus, a cephalopod mollusc, has a chorion, a lens, a retina, an optic nerve and a general aspect decidedly like that of a fish. As an optical instrument it must obviously function in the same manner as does the eye of an aquatic vertebrate; but not one part of the eye of a cephalopod is homologous with that of a vertebrate. Because these two types of eye look alike and function alike, but arise from quite different embryonic primordia adapted to meet a common function, they are known as analogous structures. They are to be sharply contrasted with homologous structures, which may be widely different in form and function so long as they arise from equivalent embryonic primordia. Both homologies and analogies imply changes in relation to the environment and, therefore, plainly favor the idea of descent with modification.

CONNECTING LINKS

If one group of animals has been derived by descent from an other there should be some forms more or less intermediate between the two and with some charactertistics of both groups. Many such connecting links actually exist at the present time. Almost every order of animals possesses some primitive members that have doubtless evolved at a slower rate than their relatives and have on that account retained a larger measure of ancestral traits than have the more typical representatives of the group. Thus there is a group of primitive annelid worms, represented by Dinophilus, Protordrillus and Pollygordius that serve partially to bridge the gap between the two grand divisions, annelids and flatworms. The case of the several species of Dinophilus is especially noteworthy, for these little animals are so evenly balanced between the characteristics of one phylum and those of the other that some authors place them among the flatworms, others among the annelids and still others are inclined to place them in an anomalous group by themselves. There is an interesting genus of primitive centipedes, called Peripatus, which possesses about as many annelid features as arthropod features. Among vertebrates we have the familiar example of the lung fishes with both the gills of fishes and lungs homologous with those of land vertebrates. And finally, we may mention those curious egg-laying mammals, monotremes, of Australia and New Zealand, which though obviously mammalian in most respects, possess, in addition to laying eggs after the fashion of reptiles, many other decidedly reptilian traits. The reader interested in following up in more detail this interesting branch of comparative anatomy will find the subject skilfully handled by Geoffroy Smith in a volume entitled *Primitive Animals.*

Comparative anatomy is a mature and well-organized science and involves a vast amount of technical data. No one but a trained comparative anatomist can reasonably be expected to appreciate the dependence of this subject upon the principle of evolution. Without evolution as a guiding principle comparative anatomy would be a hopeless mass of meaningless and disconnected facts; with the aid of the principle of homology, an evolutionary assumption, it has grown to be one of the most scientific branches of biology. This may be taken as an illustration of the nature of the proof of organic evolution; that when it is used as a working hypothesis or guiding principle, it really works in that it is not only consistent with all the facts, but lends significance and interest to facts that would otherwise be drab and disconnected.

Evidences from Classification

The object of classification is to arrange all species of animals and plants in groups of various degrees of inclusiveness which shall express as closely as possible the actual degree of relationship existing between them. In pursuance of this object we begin by grouping together as one species all animals that are essentially alike in their anatomical details. As an example of the methods of classification we may take the following familiar instance: the European wolf is a particular kind of animal constituting a species called *lupus* (the Latin word for wolf) all members of which are more like one another than they are like wolves of other sorts, for the reason that they have a common inheritance. There are not a few other species of wolves, each given a Latin name, and all these wolf species, including dogs (believed to be domesticated and therefore highly modified wolves) are placed in one genus, Canis. Several other genera of more or less wolflike animals, such as jackals and foxes, are grouped with the genus Canis and constitute the family Canidae, the assumption being that they are all the diversified descendants of some common wolflike ancestor. Other families, such as the cat family (Felidae), the bear family (Ursidae) and several other families of terrestrial beasts of prey, constitute the suborder Fissipedia. These in turn are grouped with the marine beasts of prey, such as seals, sea-lions, walruses (suborder Pinnipedia) to form the mammalian order, Carnivora. Several other orders of animals with many characteristics in common are combined to form the class mammalia, which is one of several classes belonging to the subphylum Vertebrata, a branch of the phylum Chordata. A phylum is one of the grand subdivisions of the animal kingdom and is made up of species with the same fundamental plan of organization, the common features of which are believed to be derived from a common ancestral type.

The underlying assumption of classification is the same that underlies comparative anatomy; that degrees of resemblance run parallel with degrees of blood relationship, that the most nearly indentical individuals are most closely related and that those that bear the least fundamental resemblance to each other are either not genetically related at all or else had a common ancestor far back in the misty past when animal life was in process of origin. We have already shown that this assumption holds good in all cases where it has been possible to put it to the test. No further justification need be offered in this place for making use of the only adequate instument of classification: the principle of homology.

What Is a Species

The completed classification of any large group, such as the vertebrates, presents itself as an elaborately branching system whose resemblance to a tree is unmistakable. The phylum branches into subphyla, some of the latter into several classes, classes into orders, orders into families, families into genera, genera into species, species into varieties. We may compare the phylum to one of the main branches coming off from the trunk, while the varieties may be thought of as the terminal twigs. This tree-like arrangement is exactly what one would expect to find in a group descended from a common ancestry and modified along many different lines. It is in reality a genealogical tree. If this striking arrangement is a part of the plan of special creation it is indeed strangely unfortunate that it speaks so plainly of descent with modification.

Man's Place in the System of Classification

There is no greater difficulty in connection with the classification of man than in that of any other living species. Indeed there are scores, even hundreds, of species whose exact affinities with other groups, are far less obvious than those of the human species. Anatomically, the genus Homo bears a striking resemblance to the anthropoid apes. Bone for bone, muscle for muscle, nerve for nerve, and in many special details, man and the anthropoid apes are extremely similar. Homologies are so obvious that even the novice in comparative anatomy notes them at a glance. Man is many degrees closer anatomically to the great apes than the latter are to the true monkey, yet the special creationist insists upon placing man in biological isolation as a creature without affinities to the animal world. If a man is a creature apart from all animals it is extremely difficult to understand the significance of the fact that he is constructed along lines so closely similar to those of certain animals; that his processes of reproduction are exactly those of other animals; that in his development he shows the closest parallelism step for step to the apes; that his modes of nutrition, respiration, excretion, involve the same chemical processes; and that even his fundamental psychological processes are of the same kind, though differing in degree of specialization, as are those of lower animals.

Comparative anatomists recognize man as a vertebrate, for he has all the characteristic features of that group. He is obviously a mammal, in giving birth to living young after a period of uterine development; in suckling the young by means of mammary glands; in having two sets of teeth, one succeeding the other; in having the teeth differentiated into incisors, canines and molars; and in many other particulars of skeleton, muscular system, circulatory system, alimentary system, brain and other parts of the central nervous system. Among mammals, man belongs to the well-defined order of Primates, an order anatomically about half way between the most generalized and the most specialized of the mammalian orders. Apart from his extraordinary nervous specialization, man is a relatively generalized mammal as compared with such highly specialized types as, for example, the whales. The older taxonomists place man and the other primates at the top of the genealogical tree, assigning to him the central tip of the central branch as though the goal of all organic evolution were man. Accordingly, those mammals such as the whales, which are least like man, were considered the lowest members of the class. There has been within recent years a pronounced reversal of this anthropocentric point of view, which has resulted in a complete revision of the arrangement of mammalian orders, with the Insectivora the lowest, the Cetacea (whales) the highest, and the Primates about intermediate in systematic position.

The order Primates consists of two suborders—Lemuroidea and Anthropoidea. The lemurs or half-apes are small arboreal animals with somewhat squirrel-like habits but with flat nails and certain other primate characters. They serve to link up the primates with the most primitive of the mammalian orders, the Insectivora, which are now believed, on anatomical and paleontological grounds, to be ancestral not only to the Primates but to most of the other modern mammalian orders. The anthropoid or man-like Primates are divided into four distinct families: the Hapalidae or marmosets; the Cercopithecidae or new world monkeys; the Simiidae or anthropoid apes; and the Hominidae or men. The family Hominidae includes four genera: the genus Pithecanthropus, represented by the fragmentary remains of an extinct Javan ape-man, the genus Paleanthropus, the genus Eanthropus and the genus Homo, including in addition to the existing species Homo Sapiens, several different extinct human species known as the Dawn Man, the Neandertal Man, the Rhodesian Man and others.

WHAT EVOLUTION STANDS FOR NOW[1]

Evolution means to me, first, something of an explanation of why and how there are so many kinds of living creatures with all their varied forms and manners, yet all striving for similar ends and with much commonness of method. It means something of an explanation of the likenesses and the differences and the relationships among these animals and plants. And finally—and I say this without misgivings and without shame—it means to me something of an explanation of the likenesses and differences and the relationships between myself and all these other living things.

But evolution means to me only part and not all of an explanation of these things. It is no ultimate explanation of any of these things; that is, of life itself and the final cause of the variety and yet identity of all life, including my own life. Evolution can be only a more or less immediate or detailed explanation of how, granted life, granted matter, granted energy, granted any existence of anything at all, and granted an ultimate cause or causes, the form and the behavior of living things can be and are as they are. It is an explanation of process, not of primitive cause.

---

[1] The changes accepted since Darwin's time are presented by Vernon Kellogg, zoologist and permanent secretary and chairman of Educational Relations of the Natural Research Council. *New York Times.* Section 9: 1, 12. June 21, 1925.

A Noble Conception of Life

Evolution means outrolling, unfolding. It means a reasonable, satisfying, ennobling conception of life, a conception that gives life infinite promise. Organic evolution is the outrolling of the plan of life, the unfolding of the possibilities of life. It runs naturally and logically from simple to complex, from the general to the special, from the lowly to the high, from amoeba—and simpler—to man.

Evolution means continuity, means transmutation, the origin of the new from the old; means change, continuous movement, gradatory development. It means genetic relationship, blood cousinhood, an all-embracing genealogy of life. It means the fundamental unity of all life, however varied the appearance and the manner of it in different living kinds and individuals. It means a continuous living stream varying in appearance in its different parts, but never really broken or with its parts really separated.

Every living creature, large or small, long-lived or ephemeral, active or quiescent, myriad-celled or single-celled, is in certain fundamental structure and behavior like every other living creature. To remain alive it has need of certain physical and chemical surroundings which every other living creature has to have, and it does certain things which every other creature does.

We are one of these living creatures, and what has just been said is as true of us as it is of the rest. And just as evolution offers reasonable answers to the questions we ask about plants and animals, so also it answers many of our questions about ourselves.

EVOLUTION ANSWERS QUESTIONS

Why do we have so many things in our bodies that are much like corresponding things in the bodies of other animals? Why do we pass through, in the development of each of us from fertilized egg cell to mature individual, so many stages that are like stages passed through in the development of other vertebrates?

Why do the human fossils of early glacial time show that man of that time had a smaller brain, heavier jaws and a skeleton that indicates a less erect posture than has man of today? Why are there living races of men of much more primitive make-up than others also living today? Evolution is the reasonable answer to these questions.

The conception and formulation of the evolution idea, as we know it today, were not the achievement of any one man, not even of Darwin. And if not of Darwin, then certainly of no other. The idea of evolution and its expression have been the result of many men's thinking through many years. It is the old story of the slow progress of human understanding. . . .

From Empedocles and Aristotle, four and three hundred years before Christ, to Lamarck and Darwin, eighteen hundred years after Christ, the evolution idea had been slowly growing, spreading, ripening, but with great resting stages and with the heavy restraining, sometimes violently repelling, hand of dogmatic theology always holding or thrusting it back. With the *Origin of Species* it burst, apparently suddenly, into full bloom.

Darwin made it real and vivid to the world. He set it forth so clearly, he brought to bear on it such a wealth of detailed observation, he gave it such a reasonable and plausible basis of causo-mechanical explanation, and he found at once such valiant champions to make the necessary fight for it, that it is not surprising that the triumph of evolution has come to be generally spoken of as the triumph of "Darwinism." The triumph of evolution is at least the triumph of Darwin.

EVIDENCE ACCUMULATES

No little water has passed over the dam since Darwin's day. But the general outline of the evolution conception remains essentially as it was drawn and exhibited to the world by the master observer and thinker. New knowledge has helped to add details to this outline. For example, more has been learned in the last quarter century about heredity, one of the greatest factors in the evolutionary process, than had been learned in all time before.

A mathematical handling of biological data of certain types (data of variation, of vital statistics, etc) has been developed and has added accuracy to their analysis. Experimental work in embryology and physiology has been added to mere observation and has materially increased our understanding of these sciences. Large additions to our knowledge of comparative anatomy, paleontology and the geographical distribution of plants and animals have been made. And all these new facts and methods of revelation have greatly increased the evidence for evolution over that known to Darwin.

In connection with human evolution notable advance in knowledge has come through several lines of study. Of foremost importance is the new knowledge derived from the many new finds of human and near-human fossils in Europe, Asia and Africa, and of specimens—hundreds of thousands of them—of the handiwork of prehistoric men. A most illuminating assemblage of relics of human kinds with the earliest dating from at least half a million years ago, are now available to the student and reveal to him a gradatory series of human kinds running plainly from oldest and most brute-like to newest and most human.

Also of special importance are the discoveries of the physiological (chemical) similarities in the blood of human beings and the anthropoid apes as revealed by the so-called precipitin tests. These tests offer a new means of discovering degrees of relationship among various kinds of mammals.

The evidences of evolution from embryology have greatly increased in number and definiteness since Darwin's time. This is particularly true in the case of human embryology. The phenomena in the course of the embryological development of the human being and all other many-celled animals, invertebrate and vertebrate, are essentially similar up to a given point. From here on, the course of development of the human embryo follows, up to a further given point, that of all other vertebrate animals.

From this second point forward the human embryo agrees closely, in its further development, with the embryo of any primate (monkey or ape). And it is only very late in its embryonic life that the human embryo takes on those special characters that go peculiarly with humanness.

TESTIMONY OF THE BRAIN

Take, for example, the development of the human brain. In any vertebrate embryo, including that of the human being, the brain develops at the anterior end of a hollow neural tube which expands here into three sacs corresponding to the fore, mid and hind brains. From each side of the fore-brain sac another sac grows out which expands in all directions, but especially backward, spreading over the other brain sacs and ultimately forming the cerebrum, which is so large in man in comparison with the lower animals. All of this sac, except the lower part, as well as the parts of the adult brain formed from it, is known as the mantle or pallium, of which that part which forms the major part of the cerebrum is known as the neopallium.

Now, the early condition of the neopallium in the human embryo represents about the whole extent of the pallium in the adult fish. As it grows further backward it represents first the extent of the pallium in the next higher class of vertebrates, the amphibians, and later the extent in the reptiles. Finally, as it begins to cover the cerebellum, the human embryonic pallium is like that found in the adult stages of the lower mammals, and not until it covers the cerebellum completely do we have the fully developed human pallium.

Thus, the forebrain of man passes, in its development, successively through the various stages represented in the adult forms of the various major vertebrate groups, starting with the fish and terminating with the most developed form of the mammalian type.

Similarly, the structural unit of the nervous system, the nerve cell, or neurone, passes, in its development in man, from the very simple neurone of the fish through the increasingly complex forms in the various vertebrates, to its greatest complexity in man.

Comparative Embryology

The embryonic development of the vertebrate alimentary canal and the organs that arise from it presents some equally interesting and suggestive conditions. The canal begins as a closed tube, later open, folded off from the yolk sac and lying under the notochord of the embryo. At the anterior end of the early embryo on each side of the neck, four crevices appear, which in the fishes open the alimentary canal and form the gill clefts. In man, however, these crevices do not go on to the formation of gill clefts, but soon disappear. Their presence, however, is indicative of a fish stage in his development.

The lungs develop from the upper end of the alimentary canal by the formation of a single hollow sac, which later bifurcates to form the right and left lung sacs, which by repeated branchings develop into the highly ramified tubular structure of the adult mammalian lungs. The early, sac-like lung of the human embryo is similar in structure to the permanent saccular lung of the adult amphibians.

The heart differentiates from a portion of the mesoderm lying underneath the pharynx in the head end of the embryo. It consists at first of two straight tubes which soon fuse for part of their length to form a single tube bifurcated at each end. At this stage of development the human heart resembles that of the adult of the lowest vertebrates. Later, this single tube of the developing heart becomes partially subdivided into two successive chambers, the auricle and the ventricle, and it now resembles the adult heart of the fishes.

Fish, Reptile, Man

The auricle next divides into two cavities, and now this embryonic human heart of three chambers resembles the fully developed heart of the next highest vertebrate class, the amphibians. Later, the ventricle is also divided into two cavities and thus the four-chambered heart characteristic of the highest vertebrates and man is reached. The red blood cells of the human embryo are, when first formed, large and nucleated.

In this stage they resemble the red blood cells of adult fishes and amphibians. Later the embryonic human blood cells are similar in structure to those of adult reptiles. Finally, before birth of the human embryo, these blood cells become, as they also do in all mammals, non-nucleated and biconcave. Thus it is evident that the human heart and the cells of the human blood in their embryonic development pass through stages representing the different adult conditions of the heart and blood in successively higher vertebrate classes.

New Light on Selection

The new things that have been found out since Darwin's time have modified the general Darwinian conception of evolution more with regard to the causal explanation of species-forming than with regard to other matters. With the discovery of mutations and the Mendelian manner of heredity and of much that was formerly not known concerning the character of variations, Darwin's explanation of species-forming by natural selection has lost some of the validity assumed for it by Darwin, although natural selection is still recognized as a prime determiner of what lines of evolution may persist and what may not.

Species-forming by mutations—which are suddenly appearing as lesser or greater changes among individuals of an existing species that are inheritable, and hence fixed from the time of their first appearance, thus adding new kinds of plants and animals to the already existing kinds—shows us evolution actually and visibly occurring under our eyes.

To the biologist evolution appears visible in other ways, but to the demands of the doubter for tangible visible examples of present species-changing, mutations are the best answer. Such well-observed cases as the mutation of the evening primroses (Oenothera) and the fruit-flies (Drosophila) have already become classics in the history of our understanding of evolution.

Biologists Are Convinced

Evolution is an accepted reality among biologists. These men, thousands of them, trained in a technic which enables them to study penetratingly the phenomena of life, and devoted to a disinterested search for truth, find these phenomena consonant with the conception of evolution. As the examination of these phenomena extends and grows in precision, the evidence for evolution cumulates both as to quantity and quality. The more we know about living things the more nearly absolute becomes our conviction of the reality of evolution. Whether we want to believe in evolution or not, we simply have to.

The world seems eager to hear from the technical men of science what they can learn and tell of the causes and cures of disease, the handling of electricity and radioactivity, the analysis and synthesis of chemical compounds, the biological basis of plant and animal breeding and of agriculture and forestry and fisheries, of heredity and variation, of environmental influence, of glands and hormones, of calories and vitamines. And the world accepts gladly and confidently what the scientific men tell it about these things.

But when the scientific man finds and declares the reality of evolution by using the same methods by which he finds out these other things, and by finding the same kind of proofs on which his declarations regarding these things are based, then the world, or a certain part of it, cries: "No, we do not want evolution; we will not have it." What can the scientific man do in these circumstances? He can only say: "Well, there is evolution."

This may seem like obstinacy or dogmatism. But it is only the compulsion of truth. It is not that the scientific man is intent on proving evolution. He is not intent on proving anything. He is only intent on finding out what really is. As he studies life, plant, animal and human, he simply and unescapably finds out that evolution really is. And then he says so.

VARIATIONS AND MUTATIONS[1]

When any kind of animal or plant produces off-spring these young resemble their parents—but never exactly. There are always differences; lesser or greater. These differences are called variations.

Most of these variations are mere fluctuations around a mean and are not necessarily repeated in the next generation. Some of them, which may be more marked, are undoubtedly due to varying environmental influences and also are not repeated in later generations unless these generations are reared under the same kind of environment.

---

[1] By Dr. Vernon Kellogg, permanent secretary, National Research Council. *Scientific Monthly.* 21: 136-7. August, 1925.

But sometimes some of these variations reappear in the next and all the succeeding generations, even though the environment surrounding the development of these succeeding generations is not the same as that which surrounded the first generation in which the variations appeared. Such variations are inherited. They breed true.

Such heritable or fixed variations are called mutations, meaning that from one kind of plant or animal a new kind has been produced by a persisting change or sudden little jump. This is the production of a new kind of animal or plant. This is species-forming by mutation. It is the easiest kind of origin of species to observe. It has been observed by many naturalists. These naturalists have seen evolution actually happening.

A kind of little fly, called fruit-fly, which has been very carefully studied for several years by various naturalists chief of whom is the American zoologist, Professor T. H. Morgan of Columbia University, has given rise, under their eyes, to many mutations. These are new kinds of fruit-flies. Most of them are not kinds better fitted for existence than the original kind of fly from which they arose. But some are sufficiently fit to persist. They can hold their own in the struggle for evidence. They are new additions to the kinds of fruit-flies. They are visible evidences of the present-day evolution of animal kinds.

Similarly, botanists have seen new kinds of plants arise by mutations. The most famous cases of this kind are the mutations of the evening primroses, first carefully observed and described by the great Dutch botanist De Vries, of the University of Amsterdam, and later observed and studied by German, English and American botanists. These new kinds of evening primroses, arising by fixed "jumps" or mutations from a species called Lamarck's evening primrose, are visible evidences of the present-day evolution of plant kinds.

THE TRUTH OF EVOLUTION[1]

Not only has evolution occurred; it is occurring today and occurring even under man's control. If one wishes a new vegetable or a new flower it is, within limits, true that he can order it from the plant breeder and in a few years he will produce it. Hundreds of new plants and animals have been and are being produced in this way. This is evolution of just the sort that has always occurred, only it is influenced by man's purpose. We can see evolution occurring in our experiment stations and our laboratories and we can control and modify the conditions of the experiments and can thus modify the resultant product to suit ourselves. Evolution is a present observable phenomenon as well as an established fact of past occurring. The organisms produced by this present-day controlled evolution in our experiments are as divergent from one another and from the original stock as are animals and plants in nature. The different kinds of domestic horses, produced by human experiment, differ far more than do the different kinds of horses found in nature. Domestic fowl under man's control have evolved into a large number of kinds far more widely divergent than are the wild kinds in the genus gallus from which our domestic chickens came. The genus *Brassica,* plants belonging to the mustard family, include a number of different sorts of plants. One of the, *Brassica Oleracea,* is the ancestor, the form from which man has evolved the cabbage, the cauliflower, kale, Brussels sprouts, Kohl rabi and the Swedish turnip, which differ among themselves far more than do the wild members of the genus *Brassica.* The same sort of thing is seen in hundreds of domestic animals and plants, dogs, cattle, sheep, pigeons, cucumbers, radishes, lettuce, dahlias, roses, wheats, corns, strawberries, peaches, apples, pears, etc. This is all true evolution and is going forward today with ever-increasing strides. To describe adequately the tremendous mass of phenomena which establish the fact of past and continuing evolution would require not a book or a series of books, but a library. In the main these evidences may be arranged in four chief groups: (1) The phenomena of comparative anatomy; (2) the phenomena of comparative embryology; (3) the phenomena of paleontology and geology, and (4) the phenomena of geographical distribution. Much in the fields of physiology, psychology and human cultures has very important bearing upon evolution.

---

[1] By Dr. Maynard M. Metcalf, Johns Hopkins University. *Scientific Monthly.* 21: 291-5. September, 1925.

(1) We can arrange plants and animals in a double parallel series showing increasing complexity of organization.

(2) In the development of an individual from egg to adult this individual passes through a series of stages of increasing complexity and this individual series in one of the higher organisms strangely parallels and agrees with the racial series first mentioned.

(3) In the fossiliferous rocks we find actual bodily remains of organisms of the past and these form a series showing increasing complexity within each taxonomic group, the animals and plants in the older rocks being more simple, while the successively younger rocks show more and more complex organisms in each group under observation.

(4) The distribution of animals and plants over the earth is such as to suggest strongly the origin of each group of animals or plants at some one place, and their gradual spread from that center, divergent evolution occurring while they are spreading. No other suggestion even plausible, let alone convincing, has been made to explain these phenomena. Evolution is the only key we can find.

IS DARWINISM AT THE DUSK OR AT THE DAWN[1]

How, then, has it come about that an impression has spread abroad that Darwin's theory has collapsed? I believe this impression is due to a wrong interpretation placed by the public on the discussions and heated arguments which shake scientific societies after each fresh discovery. I may use a present instance to illustrate my meaning. Dr. H. F. Osborn, the experienced and expert head of the American Museum of Natural History, New York, in May of the present year, published a full account of an imperfect molar tooth found in a Pliocene deposit of Nebraska. Dr. Osborn and his colleagues, after a prolonged search and comparison with other teeth, came to the conclusion that this Nebraska fossil tooth most resembled those of the Java man—Pithecanthropus. On the strength of this solitary imperfect molar tooth Dr. Osborn created a new genus of extinct humanity, which he named *Hesperopithecus*. In *Nature* (June 10, 1922) Dr. Smith Woodward, Keeper of Geology in the British Museum and highly skilled in the identification of fossil remains, sets forth the conclusions he has formed of the Nebraska tooth, basing his inferences on Dr. Osborn's figures and description. In his opinion, it is the tooth of a Pliocene bear! In the *Illustrated London News* (June 24, 1922) appeared an article on the Nebraska tooth by Professor Elliot Smith, of the University of London. He supports Dr. Osborn's contention. His article is accompanied by a double-paged picture, not only of Hesperopithecus himself, but also of his wife, drawn by that incomparable portrayer of ancient humanity, Mr. Forestier. Professor Elliot Smith admits that "the discovery of a single tooth may seem a frail and hazardous basis upon which to build such tremendous and unexpected conclusions," and further states that Mr. Forestier's representation "is merely the impression of a brilliant artist's genius." Thus we find that, working on the same fossil tooth, one expert reconstructs a human being, while the other brings into being a primitive bear! There seems room for a smile as well as scepticism on the part of the public. That is, however, because the "man in the street" does not know that the body of English science, as is the case with the body of English law, has been built up by the trial of a long series of contested instances. The meeting rooms of learned societies are the law-courts of science; anyone entering when a case, such as the Nebraska tooth, is being tried, and listening to the advocates for the prosecution and defence, finds such sharp contradictions between them that he believes neither and expects the jury to bring in a verdict against evolution. The visitor forgets, or is ignorant of the fact, that in this case Osborn, Smith Woodward and Elliot Smith are all strenuous supporters of Darwin's theory. The case which is being tried is not the truth of Darwin's theory, but whether a certain tooth is that of an extinct man or an extinct bear. The common-sense man will ask: "Why did not Dr. Osborn keep the questionable tooth in a cupboard until he had further evidence to prove the nature of its original owner?" The answer is that he might have kept it a lifetime and made no further progress. Now that he has wakened the interest of mankind in his problematical discovery, he has also enlisted hundreds of eyes to extend the search for further evidence and hundreds of minds to explore new sources of discovery. Time and additional evidence will settle whether Hesperopithecus is a man or a bear. Whatever the final verdict may be, Darwinism stands as firmly as before, but not the tradition of a special creation.

---

[1] Excerpts from article by Arthur Keith, Conservator of Museum and Hunterian Professor, Royal College of Surgeons of England. *Nineteenth Century*. 92: 173-82. August, 1922.

Several other recent cases of the same kind may be instanced. The lower jaw of the Piltdown man's skull is stamped with many ape-like features. In many points it resembles the lower jaw of a chimpanzee. Indeed, so great is the degree of resemblance that a high authority in America declared that Dr. Smith Woodward had made a mistake in fitting this fossil jaw to the fossil skull near which it was found in the Sussex gravel. The American authority separated the jaw from the skull and created a new species of chimpanzee for the one and a new species of man for the other. This explanation presupposes that ancient Sussex was occupied by a low type of man and a high type of ape, and that by a strange concatenation of circumstances their remains became mingled together in the Piltdown gravel. The final verdict has gone against the American authority and in favor of Dr. Smith Woodward; but even had it been otherwise, the basis of fact on which Darwin's theory rests would have been in nowise affected.

Popular opinion was much stirred by a public lecture given by a very able anatomist—Professor Wood Jones—at Kings' College early in 1918. On the evidence available in their time, both Darwin and Huxley held the opinion that man and the anthropoid apes were descended from the same ancient stock, but that man, both in body and mind, has departed very much further from the ancestral type than have the anthropoid apes. Indeed, a careful reading of Darwin's statements will show that he remained in some doubt as to the stage at which the human lineage broke away from that of the anthropoid apes. He was conscious of the need for more evidence. In his lecture Professor Wood Jones emphasized the number of very primitive features retained in the body of man, features which belong to the earliest and oldest forms of primate animals. To account for them he thought it necessary to trace man's lineage back to a much lower stage in the primate phylum than Darwin had done. He traced man's lineage back to the stage now represented by that curious Bornean animal, *Tarsius spectrum*. The problem thus raised by Professor Wood Jones was fully discussed at the Zoological Society in 1919 by the leading experts in this country, and a verdict was given against him and in favor of the older and Darwinian view. Yet I saw in a newspaper the other day, over a clergyman's signature, this statement: "Did not Dr. Wood Jones, Professor of Anatomy in the University of London, deny Darwinism in a lecture delivered early in 1918?" Professor Wood Jones, as is the case with every living anatomist, is an evolutionist—a believer in the origin of man from a lower and older primate type. He did not seek to deny, but only to modify in one respect, the theory put forward by Darwin. No one knew better than Darwin, or stated more plainly, that his theory would have to be modified or even replaced as knowledge accumulated. But not any man of science has proposed to readopt the Mosaic account as a solution of the difficult problems with which he is confronted.

For most men the truth or untruth of Darwin's theory of man's origin only comes within the range of their speculative thoughts, but for all who are investigating the problems of living matter Darwinism enters into their daily work. They depend on it, trust it as implicitly as a navigator does his admirality charts. This is particularly the case with professional students of the human body who, as is the case with the writer, have to discover and to impart knowledge to generations of medical students. The reader will understand this aspect of Darwinism if I give a few illustrative instances. Everyone is familiar with the fact that children are occasionally born with the condition of "hare-lip;" in the complete form a cleft proceeds downward from each nostril, dividing the upper lip into three parts. The surgeon can mend the deformity by operation, but the aim of the anatomist is to discover why such a malformation should occur and, if possible, propose means to prevent its occurrence. For help he turns to embryology and finds that toward the end of the second month of development the upper lip is formed by the union or fusion of three structural elements. If union fails the condition known as "hare-lip" results. He has then to answer the question: Why should the human lip be originally cleft into three parts? A suggestion is given as to the direction in which a search should be made by the simultaneous changes taking place in the neck of the embryo; gill furrows are then disappearing. A search among living fishes shows that in one type, which has retained many old and primitive characters, the upper lip, or what represents an upper lip, is divided into three parts by a cleft descending to the mouth from each nasal opening. "Hare-lip" represents the persistence of an evolutionary change which occurred long ago at a very distant stage of man's history. At the present time investigators are entering the second part of this problem and are seeking for an answer to this question: Why should this stage occasionally persist?

Another puzzling occurrence was solved in a similar manner. Some children are born with congenital malformation of the heart, by far the commonest form being the interpolation of a small additional chamber on the right side of the heart. A study of the development of this organ in the human embryo has revealed the presence of an extra chamber, which, in normal circumstances, becomes gradually merged into and absorbed by the right ventricle. The extra chamber, which makes a transient appearance in the human heart, persists as an active structure in the hearts of sharks and rays. How are we to explain the occurrence of this fourth chamber in the heart of the human embryo and its occasional retention in the child, unless we accept the validity of the Darwinian theory?

We may take another instance from a discovery recently made by Professor Dendy, of King's College, London. He found that certain remarkable fibres which pass along the spinal cord of fishes arose in connection with a peculiar plaque of cells situated in a passage of the brain. He naturally wished to know what had become of this plaque and its fibres during the evolution of higher vertebrates. He was able to demonstrate that even in the brain of man a rudiment of the plaque is still preserved, although no one had noted its presence before. Darwin's theory is an engine of discovery; it guides men to the observation of new facts.

For the brain surgeon Darwin's teaching is not a theory, but a basis of practice. He has found by experience that knowledge gained from a study of the brain of anthropoid apes can be directly applied when operating on the brain of a child or of a man. Physiologists have found that the "functional areas" which exist in the brain of anthropoid apes are represented—and are often elicited by disease or as the result of accidental injury—on corresponding convolutions of the human brain. The correspondence becomes less as we descend the ape scale. Again, when a peculiarly human disease has to be investigated, such as syphilis, it is found that, of all living animals, only the anthropoid apes show a high degree of susceptibility to human diseases. When the chimpanzee is kept in confinement it becomes the subject of that peculiarly human affliction, appendicitis. Nearly twenty years ago Professor Nuttall, of Cambridge, showed that the blood of anthropoid apes is most akin to human blood in its reactions. Whatever may be the view of Darwin's theory in popular imagination, there can be no doubt of the strength with which it has become established in the minds of men who are adding yearly to our knowledge of the structure and function of the human body.

I have only touched in this article on the kind of evidence which compels scientific men to believe in the truth of evolution as applied by Darwin to man's origin. His contention that man cannot be regarded as having arisen as an independent creation may assuredly be taken as fully proved. But when we are asked to explain the exact nature of the evolutionary machinery which has shaped human beings out of ape-like forms we have still to admit, an admission which Darwin insisted on in all his writings, that we have much to discover. It is true that no one has succeeded in producing a new species—one which has been proved to be incapable of breeding with the parent species—but he would be a bold prophet who declared that this was nature's secret, and man would never find it out. One discovery of recent years, the discovery that the development and growth of all parts of the body are regulated and coordinated by a "hormone" mechanism, is likely to throw a new light on the manner in which new and useful characters come into existence. Hormones are substances thrown into the circulating blood by the ductless glands of the body. In our hospitals medical men are now investigating the remarkable transformations of body and mind which follow disorders of the ductless glands. A fuller knowledge of the action of hormones cannot fail to throw a new light on the machinery of evolution. In Darwin's day the hormone system was unknown, but it is just such a system as he was in search of and one which he would have seized upon and applied if it had been discovered in his time. Recent discoveries, far from overthrowing Darwinism, serve to strengthen it. Thus it will be seen that, in the judgment of those best qualified to pass an opinion on the theory put forward in *The Descent of Man,* Darwinism, far from being at the dusk, is only at the dawn.

THE ASCENT OF MAN[1]

As regards fundamentals there can be no antithesis between scientific description and religious interpretation. For they use incommensurable categories. If the religious man has attained to the vision of God, nothing that science can say will affect that reality, save in increasing the wonder of it. For it is plain that communion with the Divine, which lies at the heart of religious experience, is out with the scientific universe of discourse. It is possible that the scientific skeptic may regard the religious vision of the unseen universe as an illusion, just as it is possible that the philosophical skeptic may regard the naive view of the seen universe as an illusion; but there is no possible way in which science could disprove God. Thus, writing as a student of science from the naturalistic point of view, which excludes in description any extra-natural power (force, entelechy, or elan), Professor Lloyd Morgan maintains in his *Emergent Evolution* (1923), that there is nothing in scientific cosmography that precludes an acknowledgment of God. The same applies to other transcendental concepts to which we are led by experience which cannot be called scientific. The only proviso is the avoidance of self-contradiction. We cannot have idea-tight compartments in our mind; our synoptic or all-round view, which includes not only science but what we gain from feeling and doing, must be consistent. We say, tritely enough, that it must be consistent, yet the difficulty is that we must not try to look out of two windows at once! We must not mix our concepts. If we are trying to give a scientific description of man, we must not speak of him as a child of God. If we are trying to give a religious interpretation of man, we must not fall into the error of Dr. John Lightfoot, an eminent Hebrew scholar in his day, and likewise Vice-Chancellor of the University of Cambridge, who maintained that man was created by the Trinity on October 25, 4004 B.C., at nine o'clock in the morning.

---

[1] By Professor J. Arthur Thomson, M.A., Hon.LL.D., Regius Professor of Natural History, Aberdeen University. *Homiletic Review.* 87: 3-7. January, 1924.

What is wrong is not so much that 400,004 B.C. is a more approximate date than 4004; the larger error is in mingling with a transcendental idea of man's relation to the divine purpose a particular concrete description. For the latter cannot be given except by science. In short, we must not try to speak two languages at once. Empirical formulae we know, and transcendental concepts we know, but they will not blend.

AN ANALOGY

We had some years ago the pleasure of a short talk with a well-known poet who is not less remarkable as a man of practical affairs. He has done big things for his day and generation. In the course of conversation he said, if we understood him aright, that when he disciplined his spirit he could see fairies and sojourn in fairyland. The environment of which he became eyewitness was different from that of our everyday life, and was not even a reconstruction of it on a new pattern. In any case, fairies were as real to him as microscopic little people are to us in our zoological laboratory. As we listened to his story we felt that, as naturalists, we had nothing to say; for the poet did not obtrude his fairies into the universe of our discourse. Perhaps psychologists might have proved the fairies an illusion, but we, as naturalists, had no objection to offer. Our dominant feeling, as a matter of fact, was envy. But had the poet proceeded to explain that the manufacture of nectar in the honeysuckle was entirely a matter of fairies' distilling, we should have been up in arms at once. We should have pointed to the naturalistic "Notice to Trespassers: No fairies allowed to encamp here." But the poet was much too wise to mix his concepts. He did not offer us the alternative—botany or fairies. The question was botany plus fairies (guaranteed not to meddle) or botany alone. Perhaps the question was really in regard to what Robert Bridges has called "the necessity of poetry."

The point of the analogy will break if it is pressed, and we have not ourselves found the right-of-way to fairyland; but what we wish to suggest is that our poet was wiser in his generation than some children of greater light. For he did not obtrude his fairies into our science. Nor did he argue about their reality; he accepted them "with natural piety;" and he contrived to make one feel that one was missing something.

Similarly, there is no alternative—"God or Darwinism"; no alternative—"Man as child of God or man as highest mammal"; no alternative—"divine creation or cosmic evolution." For all these express confusion of thought. The alternative is—"Science only or science and the vision of God."

THE CHRISTIAN REVELATION AND MODERN SCIENCE[1]

For more than a hundred years there has been strife—sometimes veiled, but more often open—between "religion and science." I use the popular phraseology. More accurately, opinions as to the origins of the earth and of man which were held as a result of Christian tradition have been directly challenged by a succession of novel theories put forward by men of science. At the beginning of the last century the foundations of geology were being laid, largely in this country. Gradually it became clear, from a study of our rocks and their fossil remains, that the earth had an almost unimaginable antiquity. The coal which we dig is all that is left of vast tropical forests that once flourished here for tens of thousands of years. In successive ages of vast duration the most diverse forms of animal life have existed in these lands. The east of England has repeatedly for long periods been submerged beneath the sea. The climate has varied from tropical heat to arctic severity.

Such knowledge is now a commonplace. But when it was being established by patient discovery during the early part of last century Christian theologians showed violent hostility to the new ideas. The curious may examine the expression of this hostility in Bampton Lectures of the period, which are now happily forgotten.

---

[1] From sermon preached in St. John's Church, Cardiff, on Sunday, August 29, to members of the British Association. By the Rev. E. W. Barnes, M.A., Sc.D., F.R.S., Canon of Westminster. *Nature.* 106: 10-12. September 2, 1920.

On second-hand bookstalls it is not uncommon to find pathetic attempts to reconcile geology and Genesis such as were continually made even to our own time. But truth triumphed. Just as two centuries earlier the Roman Church had failed to prevent men from receiving the then new knowledge that the earth was not the fixed center of the universe, so the new geological ideas won their way despite religious prejudice. Galileo triumphed; it is agreed that the earth moves round the sun; heliocentric books were removed from the Roman Index in 1835. The early nineteenth-century geologists triumphed; it is agreed that life has existed on this earth for something like a hundred million years. Though in each case the new views are directly opposed to those which Christianity took over from Judaism, we accept them with confidence and surely without harm to our faith in Christ.

But sixty years ago a far more vital controversy began when the Biblical account of man's origin was disputed. A series of discoveries in caves and river-beds in England and in France made it clear that primitive men had lived here when the mammoth, the cave lion, and the rhinoceros flourished in western Europe. Evidence quickly accumulated which showed that even in this corner of the world human beings existed more than a hundred thousand years ago. Scarcely had these novel conclusions been reached when a scientific theory was put forward which to the great majority of the religious people of the time seemed destructive of essentials in our faith. It was in the year 1859 that Darwin, in his book *The Origin of Species* urged the truth of the doctrine of evolution. At the ensuing Oxford meeting of the British Association, Bishop Wilberforce denounced the idea that man shared a common ancestry with the higher apes. His speech showed deplorable prejudice; it contained a grave error in taste, and Huxley's dignified rebuke of the Bishop is still remembered. For forty years after that famous encounter evolution was a *casus belli* between religion and science. Christian opinion refused to accept the new doctrine, and religious teachers traversed it by arguments good and bad. It is not fair to regard them with the scorn which the younger people of today, trained in modern science, not seldom feel.

Evolution was, and still is, not an observed fact, but a very probable theory. Our forefathers saw that acceptance of it meant the abandonment of the story of Adam; it meant giving up belief in the Fall, and in all the theology built upon it by theologians from St. Paul onward. Half a century ago, the evolutionary view of man's origin meant that what then appeared to be the strongest reasons for the belief that man has an immortal soul had to be set aside. But truth has triumphed. In our own time the leaders of Christian thought have, with substantial unanimity, accepted the conclusion that biological evolution is a fact; man is descended from the lower animals. It is even becoming common to say that there is no quarrel between science and religion. But let us be honest. There has as regards the origin of man been a sharp conflict between science and traditional religious belief, and the battle has been won by science. . .

The time has come when we must not try to evade any implications of the theory of natural evolution. We must, not silently, but explicitly, abandon religious dogmas which it overthrows. We must, moreover, avoid the temptation to allegorise beliefs which it is no longer possible to hold. Allegory has its value, but it is misused when we employ it to obscure the revolutionary consequences of new knowledge. Religion is too important for us to base it upon, or to join it to, any theories of the nature of the universe that are doubtful or untrue. . .

Now, the Christian faith is belief in Christ, in His Person, and in His teaching. If Jesus was Divine, His spiritual revelation was without error, His example perfect. In so far as He was man we expect His secular knowledge to have been that of the Galilean carpenter's son. But we can no longer call ourselves Christians if we find that we are forced to admit that He was morally imperfect or mistaken in His view of God or of man's relation to God. I contend that the progress of science has not forced us to make any such admission. It has not destroyed the spiritual infallibility of our Lord, or done anything to upset His teaching as to the nature of God, or as to man's nature and destiny. It has rather, as I hold, confirmed His insight and made His spiritual wisdom more profoundly impressive.

Traditional Christian belief was built up of other things besides Christ's teaching. The early Christian church took over the old Jewish Scriptures because it deemed them inspired by God. It placed among its sacred books writings of St. Paul and other earlier followers of the Lord because it found that they reflected the Mind of the Master. But there never was a time when thoughtful Christians could thoughtfully have maintained that the Jewish Scriptures were free from moral and historical error. The cursing Psalms are obviously un-Christian. Books like Kings and Chronicles are rival histories which disagree in spirit and in detail. As a matter of fact, the church has never formally defined inspiration. We may say truly that inspired books are of peculiar spiritual value; but we may find such value in St. Paul's teaching, though we freely admit that his arguments were sometimes unsound. If we discover that old Christian beliefs which did not come from Christ are erroneous let us not be troubled. For Christianity the perfection of Christ's religious teaching and His revelation of His own supreme excellence are alone of decisive importance. Views of ancient Jews or of early Apostles we can abandon when we discover that they were wrong. Christianity is belief in Christ as Way, Truth, and Life;

belief that He was the Light of the world, the Guide of the spiritual evolution of humanity. It is not belief in the scientific value of Genesis or even in the infallibility of St. Paul. Grasp this fact firmly and you will understand that last century's tragic quarrel between religion and science had its origin in a natural, but none the less deplorable, mistake. . .

Science describes the process by which man has come into being. Religion takes man as he is and offers him guidance toward his spiritual destiny. Between the religious revelation of Jesus and modern science there is no opposition. The two dovetail into one another with singular exactness. Evolution describes facts; the ultimate meaning of those facts Christ's teaching discloses.

AGAINST EVOLUTION

THE EVOLUTION HYPOTHESIS IN THE LIGHT OF MODERN SCIENCE[1]

. . . Evolutionists have become so engrossed with the idea that evolution is true that they regard any re-examination of the facts which they allege support evolution as unnecessary. It is the purpose of the present article to show, first, that some of these alleged facts can be accounted for adequately by another explanation than that of evolution; second, that others of these alleged facts are actually not facts at all; and third, that modern biology has actually examined all possible causes which might have produced evolution; and the fact that none of these causes nor any combination of these causes can be supposed to have brought evolution about, is conclusive proof that evolution has never occurred.

1. EVOLUTION NOT THE ONLY POSSIBLE EXPLANATION OF FACTS ALLEGED TO SUPPORT IT

I. EVIDENCE FROM COMPARATIVE ANATOMY

One of the principal groups of facts alleged to prove that evolution has occurred, is the evidence from comparative anatomy. As one looks at the different species found in nature, one cannot but be impressed with the fact that there are most remarkable resemblances between the different species and families of animals and plants. The very fact that the animals and plants can be arranged in groups, families, and species, in an ascending scale from the simplest organisms up to the most complex, is a fact which almost hypnotizes one into the belief that there must have been development from one group to another group, and from a lower species to a higher. And the moment that this idea of development seizes us, the temptation is almost irresistible to assume that the development from one species to another actually has occurred, and with this assumption as a basis, to fit all other facts into the scheme of development. But let us remember that what we have actually done has been artificially to arrange the different species in this ascending scale. In nature today, the different species of animals and plants exist side by side with nothing to indicate that one species has developed from another species or that two or more species have developed from a common ancestor, except the fact that there are certain remarkable resemblances between the species themselves. But similarity of form and structure does not prove that one species must have evolved from another species. Such similarity may raise a strong presumption that there is a necessary connection between the two species, but it does not prove that such a connection exists.

---

[1] By Floyd E. Hamilton, B.D., Professor of Bible, Union Christian College, Pyeng Yang, Korea. *Princeton Theological Review.* 22: 420-46. July, 1924.

The many different varieties of automobiles and motorcycles have a great many points in common. They can all be arranged in an ascending series from the little motor-driven bicycle, through the different kinds of motorcycles up through the Fords to the various kinds of expensive limousines, but the fact that they can be so arranged does not prove that one variety has evolved from the other. In the same way the fact of similarity between species does not prove evolution. There may be other causes which adequately account for such similarity. We are not forgetting or leaving out of consideration the evidence from paleontology which is alleged to prove evolution, and that evidence will be examined in another section, but the point we insist upon here is that similarity of form and structure between species does not prove that there is a development relation between the species themselves. If such a development relation is to be proved to exist, other evidence must be adduced to prove it. For the most that similarity can do, is to raise a presumption in favor of evolution, but if another and equally plausible explanation of such similarity can be found, the assumption in favor of evolution disappears.

The other adequate explanation of this similarity is found in the assumption of a creation of each species by a personal God. On independent grounds the theist reaches the conclusion that a personal God exists. If this conclusion is correct, and if God is the actual ground for the existence of the universe and of matter and if even on an evolutionary hypothesis the only adequate explanation of the existence of the first living cell is to suppose that God created it, there is no presumption against the possibility of His having created each species. If He did create each species, then the similarity between the species would be adequately accounted for by the fact that the different species were created on a similar plan by the same Great Architect.

The apparent presumption in favor of evolution is really based on the assumption that there is no personal God. The older evolutionists believed that it was possible to account for the existence of the present universe by assuming that matter and force were both eternal. If this were a tenable position, a strong presumption in favor of evolution would be raised. The present day scientist, however, in face of the facts brought to light by modern discoveries in connection with radioactive elements, is obliged to abandon the claim that matter could have evolved into the present group of eighty or more elements, under the action of forces now known to exist, for these recent discoveries show that the radioactive elements are undergoing a process of decomposition. Dr. E. N. da C. Andrada, the noted physicist in a recent article in the *London Outlook,* in speaking of "radioactive decay" states the case as follows: "The radioactive atoms are disintegrating, falling to pieces, and becoming lighter atoms. . . . Not only, therefore, are atoms not indestructible, but some of them destroy themselves. We look on, and note the transformations; we cannot stop them, nor can we hasten them. The reverse process has never been detected. No atom has been caught absorbing energy and building itself up to something higher and heavier. We have decay, but we have not witnessed resurrection." What is this but saying that the law of the uniformity of nature could not always have existed, and that supernatural intervention actually occurred in the past? If supernaturalism occurred in the case of the creation of matter, it is logical to suppose that it occurred also in the creation of life, and if the first life was created, there is no logical reason why it should not have been created in the form of the different species, instead of being, as the theistic evolutionist assumes, created as a single cell from which all other life evolved. If it is necessary to bring in supernaturalism to account for the existence of matter, there is no longer reason for keeping supernaturalism out of the whole series, and if supernaturalism is once brought in, it is as easy to account for the similarity of form and structure in the organic world by assuming that they were created by the same Master Mind as it is to account for them by assuming that the different species evolved one from the other.

2. Evidence from Embryology

The facts from embryology have long been regarded as one of the chief lines of evidence in favor of evolution. Summarized briefly, the evidence is as follows:— In their embryonic development, the individuals of various higher species pass through stages of development which are supposed to represent past stages of evolution through which the race has passed. Expressed in the technical language of modern zoology: ontogeny recapitulates phylogeny. That is to say, the development of the individual contains a shortened record of the development or evolution of the race.

The theory of recapitulation, as it is called, of course, begs the whole question of evolution, by assuming its truth and using the assumption as a basis for the theory. If there has been no evolution, then however much the embryos of the higher animals may resemble those of lower animals, the resemblance would not prove connection or evolution. If evolution could be proved to be true on independent grounds, then it might account for the resemblance between the embryos, but as independent proof of evolution it is worthless, especially as such resemblance would be amply accounted for in the fact that the same God made both. Certainly no one would insist that the Almighty must use a different pattern in making each of the embryos of all the different species of animals!

But as we examine the facts upon which this recapitulation theory is based, we find that they are even less in support of the theory of evolution. In the first place, as Adam Sedgwick, the English zoologist, says:

> When we look for the facts upon which it is based, we find that they are non-existent, for the ancestors of all living animals are dead, and we have no means of knowing what they were like. It is true there are fossil remains of animals which have lived, but these are so imperfect as to be practically useless for the present requirements. Moreover, if they were perfectly preserved, there would be no evidence to show that they were ancestors of the animals now living. They might have been animals which have become extinct and left no descendants. Thus the explanation ordinarily given of the embryonic structures referred to is purely a deduction from the evolutionary theory.

The same author goes on to speak of

> The view that in the course of evolution the tendency has been for structures to persist in the embryo after they have been lost in the adult. Is there any justification for this view? It is clearly impossible to get any direct evidence, because, as explained above, we have no knowledge of the ancestors of living animals; but if we assume the evolution theory to be true, there

> is a certain amount of indirect evidence which is directly opposed to the view. As is well known, living birds are without teeth, but it is generally assumed that their edentulous condition has been comparatively recently acquired, and that they are descended from animals which at a time not very remote from the present, possessed teeth. Considering the resemblance of birds to other terrestrial vertebrates, and the fact that extinct birds, not greatly differing from birds now living, are known to have had teeth, it must be allowed that there is some warrant for the assumption. Yet in no single case has it been certainly shown that any trace of teeth has been developed in the embryo. The same remark applies to a large number of similar cases; for instance, the reduced digits of the bird's hand and foot and the limbs of snakes.

Professor Sedgwick then proceeds to show that the embryonic organs which are not present in the adult animal, have, in all probability, a definite function to perform in the embryo, and that their presence is accounted for by this fact rather than that they are there because some ancestor possessed them in the adult state. We thus see that when closely examined the evidence for the recapitulation theory breaks down at vital points.

Another law of embryology which is supposed to support evolution is called "Von Baer's law." This law says: "Embryos of different species of the same group are more alike than adults, and the resemblances are greater, the younger the embryo examined." This is supposed to indicate evolutionary relationship between the species of the same group. Professor Sedgwick shows that there is evidence directly against the truth of the law.

> If it were true we should expect to find that the embryos of closely similar species would be indistinguishable, but this is notoriously not the case. On the contrary they often differ more than do the adults, in support of which statement the embryos of the different species of "Peripatus" may be referred to. The generalization undoubtedly had its origin in the fact that there is what may be called a family resemblance, which is by no means exact, is purely superficial, and does not extend to anatomical detail. On the contrary, it may be fairly argued that in some cases embryos of widely dissimilar members of the same group present anatomical differences of a higher morphological value than do the adults, and, as stated above, the embryos of closely

allied animals are distinguishable in all stages of development, though the distinguishing features are not the same as those which distinguish the adults.

If the facts of embryology are such as Professor Sedgwick says, where is the much vaunted evidence for evolution? Both the recapitulation theory and Von Baer's law are deductions from the evolutionary theory, rather than proofs of it, and when closely examined are found to be unsupported by the facts. Even were they true generalizations from observed facts, the facts could be accounted for by supposing that the same God created the different species after the same general plan, but as we have seen, the facts do not support the generalizations, and all the evidence for evolution from embryology, disappears when closely examined by a mind unbiased toward evolution.

3. Evidence from Geographical Distribution

A third line of evidence in support of the theory that evolution has occurred in the past, is found in the geographical distribution of the plants and animals in different parts of the world. It is claimed by evolutionists that the fact that animals and plants in different localities and different segregated regions, differ greatly from those in other regions and localities, proves that the species in the same localities are more closely related in their evolutionary history than are species in different localities. The species according to the evolutionary theory are supposed to have originated in some one center and from this center to have spread all over the world, becoming differentiated in different ways as they separated.

At first glance this seems strong evidence in favor of evolution, but a closer examination shows that the strength is apparent rather than real. In the first place we notice that here again the evidence is circumstantial rather than positive. If the theory of evolution can be proved on independent grounds, it might possibly account for the fact that the flora and fauna of different regions differ from those of other regions, but the fact that they differ does not prove that evolution must have occurred, because there is another possible explanation of the facts of geographical distribution. This other explanation is that God may have created the different species with peculiar adaptations to the environment in which they were to be placed. Or they may have all been created in the same general region and scattered from there over all the earth, but only those species which were suitably adapted to the environment of the different localities were able to exist in those localities, while the others were killed off. Some species may have gone only in one direction and settled only in one locality, which would account for finding certain species only in certain regions of the earth, though there are other regions which are just as suitable for them. Such an explanation of the facts is just as logical as the evolutionary theory, but the facts themselves prove neither the theory of evolution nor the theory of special creation, and these theories must depend upon other facts for their support.

In the second place the idea that geographical distribution of the species proves evolution rests largely upon the idea that species are able to adapt themselves to their environment. If this were the case, there would be more reason to claim that geographical distribution supports evolution, but biology has now proven that no acquired characteristics are inherited, so it is manifestly impossible for a species to adapt itself to its environment. Yet it is these cases of remarkable adaptation to environment that evolutionists must explain. How explain the fact, for example, that the polar bear has fine hairs on the soles of his feet which enable him to walk on the ice in the polar regions, while the hairs are missing in all bears of the temperate climates? It seems probable that the polar bear could not have existed on the ice packs of the Arctic region without these hairs on the soles of his feet, yet why are they found only on this animal and not on the bears of the temperate climates? Are we to suppose that the polar bear lived on the land until he became possessed of the hairs on the soles of his feet which enabled him to walk on the ice, and climb out of the icy waters onto the ice cakes?

It is thus seen that there are many facts connected with the problem of geographical distribution that are directly against the theory of evolution, and that the facts which might be explained as being due to evolution, were that theory proved true on independent grounds, can be explained equally well on the theory of special creation of the species. Evolutionists must look elsewhere for facts to prove their theory.

II. FACTS ALLEGED TO SUPPORT EVOLUTION WHICH ARE NOT FACTS AT ALL

1. BLOOD CHARACTERS

In an article entitled "Where Evolution Stands Today" Vernon Kellogg says: "There has been also, in recent times, a notable addition to the proof of man's relationships to other animals through physiological discoveries, especially those relating to blood characters." This is a remarkable statement. The writer unfortunately, or perhaps intentionally, does not state what these various physiological discoveries that prove man's relationship to the lower animals are, but doubtless he has in mind facts such as the grafting of monkey glands on human beings, etc. It is difficult to see how such facts prove relationship, for these facts are in the same class as the anatomical resemblances previously discussed. They prove equally well that the same Master Mind made both the monkey and man, and, therefore, that the characteristics which are common to life as life, make it possible to transfer glands from the animal to the human being. As a matter of fact such possibility of grafting does not prove either evolution or special creation, though it might be explained according to either theory if the theory were established on independent grounds.

Dr. Kellogg's statement about blood characters is, however, most remarkable. Here again Dr. Kellogg has not told us just what it is about blood characters that proves relationship between man and the lower animals. In fact we are even more at a loss to discover what these mysterious facts referred to may be, in view of certain other facts which seem to prove by the blood characters that there is no such relationship as is asserted between man and the lower animals. In the first place, the blood of lower animals, monkeys, apes or any other animals cannot be used in blood transfusion into the human body. Certainly that looks as though there were no relationship between the lower animals and man! In the second place the shape of the corpuscles in the blood of man and in the blood of monkeys or other animals is entirely different. Certainly these two facts are directly opposed to the theory that there is relationship between man and animals.

2. Evidence from the Fossils

Were it not for the fact the geologists have seemingly found evidence in fossil remains which they say proves that there have been five or more geological ages, each age stretching over hundreds of thousands or even millions of years, and that the fossil remains found in the rocks of each age point to a process of evolution from the lowest forms of life to the highest, the highest forms of life being found only in the rocks of the most recent age, it is to be doubted whether the theory of organic evolution would ever have been developed. If a more careful examination of the facts of geology should reveal the fact that there is no foundation for the theory of successive ages, with their corresponding series of fossil remains, then the whole theory of organic evolution is left without any evidence in its support.

Recently geologists such as George McCready Price have brought to the attention of the scientific world facts which seem to overthrow the whole theory of successive ages and with it, all the fossil evidence for evolution.

The overwhelming character of this evidence can only be appreciated by reading the arguments and evidence presented in the books by this author, *Fundamentals of Geology, Q. E. D., The New Geology. . .*

But if the theory is wrong, what becomes of the fossil evidence for evolution? It disappears with the theory of successive ages into the limbo of intellectual curiosities.

III. MODERN BIOLOGY HAS EXAMINED ALL THE POSSIBLE CAUSES CAPABLE OF PRODUCING EVOLUTION AND CANNOT FIND A SINGLE CAUSE OR COMBINATION OF CAUSES WHICH MIGHT HAVE PRODUCED IT

DARWIN'S POSITION ABANDONED

If Darwin were to come back today it is doubtful whether he would recognize his own theory in what is loosely called "Darwinism" by modern evolutionists. Most of the essential parts of Darwin's scheme have been one by one abandoned until practically all that remains is the name. In place of the parts abandoned, other features have been substituted, until the evolutionary theory of today is entirely different from that of Darwin's time. What has actually happened, however, is that one by one all the possible causes which might have brought evolution about have been examined and found wanting, until logic would seem to point to the abandonment of the general theory. This has been prevented by the hold which the theory has on the scientific mind, and also by the fact that there are today no systematists among the scientists to gather up the results of investigation along various lines and correlate them in their bearing on the general theory of evolution. The result is that while present day biologists cannot point to any cause or combination of causes which might have brought evolution about, they nevertheless express their belief in terms of faith rather than knowledge. Let us now examine these possible causes for ourselves.

VARIATION THE VITAL POINT OF EVOLUTION THEORY

The crux of the evolution question is in variation. It has long been recognized by biologists that however potent natural selection may have been in killing off species that were unfitted for the struggle for existence, it in itself was not an active cause capable of forcing a species upward on the ladder of evolution. Natural selection, in the trite but apt words of an earlier critic, may account for the *survival* of the fittest but it cannot account for the *arrival* of the fittest. All it can do is to foster the favorable variations after they occur, but it cannot cause the favorable variation to occur. Unless there are variations in an upward direction, natural selection cannot do anything to bring evolution about.

The whole question then hinges about the point as to whether there are any variations in nature in an upward direction which, if given time enough for development, might conceivably bring evolution about. Let us now take up one by one all the variations known to biologists and see whether any of them or any combination of them might produce evolution.

1. *Acquired Characters*

Lamarck and his followers claimed that the chief factor in evolution was the inheritance of acquired characters. Darwin thoroughly believed in such inheritance, and Spencer said in an article in the *Contemporary Review* in 1893: "Close contemplation of the facts impresses me more strongly than ever with the two alternatives—either there has been inheritance of 'acquired characters' or there has been no evolution." Since Weismann put forth his "germ plasm theory," biologists have come everywhere to accept the view that no acquired or environmentally produced characters are inherited! Popular writers such as Van Loon and H. G. Wells seem to be ignorant of this fact as their books are filled with statements about the different animals and man "acquiring" various organs when confronted with environmental conditions which demand their use. For instance, a popular writer recently endeavored to show how animals first began to live on the land, by saying that some of the aquatic organisms found themselves left on the shore or in a marshy place by the receding tides and gradually accustomed themselves to living on land. They gradually developed lungs in place of gills and so were able in time to stay on the land all the time! It is hardly necessary to point out the fallacy in such an argument, for it is clearly evident that it rests entirely on the possibility of the inheritance of acquired characters, which are now known not to be inherited! Much of the plausibility of evolutionists' arguments rests on the implicit assumption of the inheritance of acquired characters.

2. *Abnormalities or Deformities*

Another class of variations is the class of abnormalities or deformities, produced by disease, or by some unknown change which takes place in the germ plasm. "Club feet," two heads on one body and such variations belong to this class. Most of these are not inherited, and the ones that are, belong to the class of mutations to be discussed later. Even were more of such variations inherited than is actually the case, evolution cannot be conceived as having been brought about in this way, for all such variations are things which should render the individual possessing them less able to survive in the struggle for existence than normal individuals of the same species.

4. *Mendelian Variations*

One of the greatest contributions to the science of biology in the last century was the discovery of what has been since known as "Mendel's law." It is unnecessary to go into a detailed discussion of this law, but a brief outline of it will enable us to understand what are called "Mendelian variations."

Whenever two individuals are bred together, the characteristics of both parents are transmitted wholly or in part to the off-spring. However, instead of being equally blended, it often happens that a descendant inherits almost entirely from one parent and not from the other. This is explained by Mendelism as being due to the fact that each individual is composed of a bundle of qualities called "unit characters." These unit characters, or "genes" as they are sometimes called, are indivisible and are inherited wholly or not at all. Now some of them are what are called "recessive" unit characters. Each dominant gene has a corresponding recessive gene. When the dominant gene and the recessive gene are both present, the dominant only shows in the outward appearance of the individual, while the recessive gene shows in the outward appearance of the individual only when the dominant, with which it is usually paired, is absent. Whenever the dominant is present in the individual it shows itself in the outward appearance even though the recessive with which it is paired is likewise present.

When an individual possessing a dominant gene is crossed with an individual possessing a corresponding recessive gene, the off-spring of the first generation will all be in appearance like the dominant parent, but in the following generations the off-spring will be in the proportion of three apparently dominant individuals to one recessive. Of the three apparently dominant individuals, one of them has no recessive gene present in it, while the other two have recessive genes present which do not show in the outward appearance. The off-spring of the pure recessive will all be pure recessives, never again showing the dominant character unless rebred to an individual possessing the dominant character. The off-spring of the pure dominant will all be pure dominants unless cross-bred with an individual having both the dominant and recessive characters present and will be in the proportion of one pure recessive, one pure dominant, and two mixed dominant and recessive. Bear in mind the fact that where the dominant is present, it always shows in the outward appearance and the individual in appearance is like the pure dominants even though the recessive gene is likewise present. When a tall green pea is crossed with a short green pea, the off-spring of the first generation are all tall green. The next generation however, has the following proportion, one tall green which breeds true, one short green which breeds true, two tall green which prove to be mixed like the mixed parents.

Now when two or more different characters are involved, the result is far more complicated, but nevertheless the off-spring are in a proportion which can be determined beforehand if the crossing factors are known. The exact proportion is too complicated to be taken up here, but some of the off-spring will be different from either parent, though all the unit characters are present in either one parent or the other. For example, when a tall green pea is crossed with a dwarf yellow, some of the off-spring will be dwarf green and others tall yellow, two variations unlike either parent, though the tall and yellow and dwarf and green unit characters were present in the parents. They were not however present in that combination. When a large number of unit characters are involved, the possible combinations of unit characters are almost unlimited, though they combine according to a fixed ratio.

It will thus be noticed that there is room for a vast amount of variation according to Mendel's law. Whereever it is possible for two individuals to interbreed, there is room for new Mendelian combinations. Moreover, wherever there is an individual that is the result of a Mendelian cross, the original strains can all be separated out with time and careful breeding and selection. The modern science of plant and animal breeding is based on an application of Mendel's law.

At first sight it may seem that we have here the exact way in which evolution occurred, namely through Mendelian variations and the application of the law of the survival of the fittest, eliminating the unfit. Twenty years ago when Mendelism first came to the attention of biologists, it was welcomed as the solution of the evolutionist's problem of what causes evolution. However, as time went on, it was seen that Mendelism offers no solution whatever of this problem of what causes evolution. There are several reasons why evolution cannot have been brought about according to Mendel's law.

First, and most important, Mendel's law does not apply to any species which reproduces by the process of cell-division! In other words, since evolution is supposed to have started with unicellular organisms which reproduce by the process of cell-division, if it had had to depend upon Mendel's law, the whole process of evolution could never have gotten started! This in itself is sufficient to rule out Mendelism as a cause of evolution.

Second, suppose, however, that in some unknown manner, evolution occurred in the first stages of life, until eventually individuals were produced which reproduced sexually. Even here Mendelism could not have produced evolution, for it will be noticed that according to Mendel's law unit characters must be present in the parents in order to show in the descendants. If a hundred unit characters are present in a given group of individuals, the descendants of any possible grouping of those individuals will show only those hundred unit characters! Some individuals among the descendants will have a certain combination of the unit characters, while others will have entirely different groups of unit characters, but not one individual in the group will have a unit character different from the original hundred! In other words, you get out only the unit characters that you put in! Mendelism could never originate a new unit character! Is it not plain that even among sexually reproducing organisms, evolution could not occur according to Mendel's law? It could never get out of the circle of unit characters with which it started, and so no evolution into new and different unit characters thus producing a new species, could ever occur.

But there is still a third reason why evolution could not have been caused by Mendelism. Even were, through some mysterious process, a new unit character added to the race, it could not be perpetuated as a new species, because, in the natural state, such a unit character would immediately be mixed with the whole race by interbreeding, the individual possessing it would die off without descendants. In order to establish a new species, two individuals, possessing the same new characteristic not possessed by the ancestors, would have to be born in the same locality, would have to be of the opposite sex, would have to be fertile with each other, and at the same time sterile to all the ancestors and common relatives in that locality! A little thought will show the absurdity of such a supposition. The law of probability would render such a fortuitous grouping of circumstances absolutely impossible. If, on the other hand, we say that God brought such a combination of circumstances about, we depart from the evolutionary thesis that evolution is due to resident forces, and take away all objection to the theory that God created the separate species at the beginning when the world was created. The question in that case would be one to be decided by the evidence, and certainly the weight of the evidence would be in favor of the view that God created the separate species at the beginning when the world was created. The question in that case would be one to be decided by the evidence, and certainly the weight of the evidence would be in favor of the view that God created the individual species without any long drawn-out process of evolution.

In the fourth place, remember that in the natural state new Mendelian combinations are not perpetuated. Each new combination is lost by a reshuffling of the unit characters in the following generations. No new species could get started in the natural state through a Mendelian cross, without there occurring the same combinations of fortuitous circumstances mentioned in the preceding paragraph. We can artificially preserve a Mendelian variation by preventing it from rebreeding with other species, but in the natural state this is impossible. No new species could ever get started that way, because without the barrier of sterility to the rest of the species, and at the same time fertility to another individual having the same peculiar combination of unit characters, no new species could get started. And if by some fortuitous circumstance it should occur once, to say that all the species got started in that way would be the height of absurdity. Mendelism offers absolutely no solution of the problem of the origin of species. It accounts for inherited variations, but shows no way by which a new species could start.

5. *Mutations*

There is only one other class of variations known to science, namely mutations. Could species have originated through such variations? A "mutation" is a change in inheritance factors contrary to Mendel's law. Whenever a variation occurs which is not a unit character possessed by an ancestor, and which breeds true among the off-spring of the individual possessing the new variation, we call it a "mutation." We will divide mutations into two classes: "regressive mutations," or those changes in inheritance factors due to the loss of characteristics possessed by the ancestors; and "progressive mutations," or those changes in inheritance factors due to the addition of characteristics not possessed by any ancestors.

a. REGRESSIVE MUTATIONS

Let us first consider regressive mutations. Regressive mutations which are transmittable are known to have occurred in many well-authenticated instances. H. E. Walter, in his book on *Genetics,* names a number of such mutations, such as albinism in animals (absence of coloring matter in the skin), etc.. However many of those which Walter classes as progressive mutations are in reality regressive mutations, as they are due to the loss of characteristics possessed by ancestors. Professor Morgan of Columbia University conducted experiments with a certain kind of fly, and bred hundreds of generations of this insect, in the course of which mutations occurred covering almost every part of the anatomy of the fly, but all the mutations which occurred were regressive mutations! No new characteristics not possessed by the ancestors were added through these mutations! The fly remained a fly through all the various mutations. Individuals were born having no eyes, others with no wings, others with no legs or with certain pairs of legs missing. In fact the only thing not produced was an insect not a fly, or an insect with some characteristic added to those possessed by the ancestors! All the mutations which occurred were due to the loss of some characteristic possessed by ancestors! Now this is not evolution! Evolution represents the addition of new characteristics not possessed by the ancestors. The different species now existent could never have arisen from a single cell or a group of single cells by regressive mutations, for all the species represent additions instead of losses of characteristics possessed by single cells.

b. PROGRESSIVE MUTATIONS

There remains to be considered the other class of mutations, progressive mutations. Here, if anywhere, lie the evolutionist's hope of discovering real evidence of variations which might produce new species. But what do we find when we examine these mutations? In the first place, we find that most of the mutations which have been classed as progressive mutations, when examined closely prove to be regressive mutations. Real progressive mutations are so rare as to be almost negligible. In the words of Vernon Kellogg: "To explain the extraordinary, precise adaptations of orchids and other insect-pollinated flowers to their insect visitors, and the equally extraordinary adaptations of these visitors to their plant hosts or the remarkable adaptations of parasites, or of protectively-colored and patterned butterflies and moths, mutations are simply hopeless." But most remarkable of all is the fact that all the progressive mutations which have been observed are of one kind only, namely, additions to the number of characteristics already possessed by other individuals of that species! No mutations are recorded where an entirely new characteristic has been added to the species. To take an extreme case as an illustration of this point: cats have never developed horns nor have cows wings! In order for evolution to occur such new characteristics must be added to the stream of life. Evolutionists may be challenged to produce even one example from biology of such mutations having occurred.

Not only is that true, but all mutations which have occurred, either regressive, or progressive, are fertile with the parent stock, or else are completely sterile. This is a very important point and one which biologists are coming more and more to recognize. The present day tendency is to find the distinguishing mark of species in the fact that they will not interbreed with other species and produce fertile off-spring. If this is a true definition of a species, it is nothing less than remarkable that all observed variations or mutations are within the bounds of the same species. Such variations or mutations even were they a thousand times more numerous than they are, could never produce evolution. The species as they exist today have barriers between them in this fact of inability to interbreed. Where did this inability come from? Was it itself a mutation? If so, are we to suppose that the same mutation occurred in every one of the almost numberless species at exactly the proper time in order to conserve another mutation which would draw the individual away from the parent stock, and be fertile with other individuals having the same mutation? And if we were to assume that such an impossible thing happened once, would anyone have the courage to make the assumption in the case of every species? It is probable that many of the species, so-called, of present day nomenclature are not true species but only varieties of the same species, because they will interbreed, and produce fertile off-spring. If this regrouping and reclassifying of the species is done, it will be found impossible to produce a single example of a mutation capable of becoming the ancestor of a new species.

IS MAN A CREATION OR AN EVOLUTION [1]

There are in general just two theories regarding the origin of man, creation and evolution. The man in the street, when he speaks of evolution, means that man came by direct line from some monkey ancestry. When he speaks of creation he means that God by direct acts of creation, successive acts, placed on this earth the different forms of life, animal and vegetable, as they were fitted for the successive geologic ages, and that as the crown of creation God created man in His own likeness as to spirit, giving him an animal body as the spirit's instrument of self-expression. And the man in the street is not far astray in his idea, for evolution tries to account for the origin and development to its present condition of every part of every living organism by progressive modifications of *resident* forces, forces eternally and naturally lying within the original cell or cells from which all things have evolved. Creation presupposes a Being superior both to matter and to man, a Being Who by a power within Himself brought into being originally all that is. The *New International Encyclopedia* puts it in this way—"Darwin contributed a mechanical or natural explanation of what had before required a supernatural explanation." According to his idea, plants and animals, as individuals, develop a slight difference from their parent. This variation is very slight, almost imperceptible, so requiring ages for its definite formation. But it persists because of its usefulness, and is reproduced by transmission to off-spring until it becomes so marked that it produces a new variety of plant or animal. This variety continues to become more pronounced till its differing features justify one in calling it a new species. The theory of evolution requires ages upon ages for its support, but let it be remembered that merely showing that a man lived thousands of years ago does not in any way in itself bolster the theory nor disprove the theory. The matter of *time* may be left out of consideration, since the Genesis story of creation permits any age or ages. This needs to be kept in mind when men claim to have found the fossil skeleton of man who, they say, lived ten thousand years ago, and because of their guess to that effect imagine they have thereby improved the standing of the evolutionary theory. They have neither weakened nor strengthened it.

---

[1] By Rev. C. J. Williamson, D.D., pastor of the Highland United Presbyterian Church, New Castle, Pa. Reprinted from his pamphlet by this title, issued by the United Presbyterian Board of Publication, with the permission of the publishers.

It is generally assumed that religion teaches creation and that science teaches evolution. At the very beginning, consider what science claims to be. Science declares itself to be an exact science in which *facts* are discovered and then theories are built up to explain those facts satisfactorily. Science has no place for prejudice. It declares it utterly unscientific to conceive a theory and then attempt to bolster up that theory with facts that are distorted to seem to prove the theory. Both in science and in religion men have not all been open-minded to new light, for the reason that it threatened to overthrow some preconception. Neither real science nor real religion is afraid of fact, but both have suffered through fearful followers. And one of the main difficulties in studying facts regarding the theory of evolution lies in the vast difference of opinion among so-called scientists as to what evolution means to them. It has as many shades of belief as has socialism. But this is common to all—that they believe that man has developed from lower forms of life, not by outside influence, that is by God, but by force *resident* within the original forms.

This being true, there are various difficulties that the advocates of that theory must face if they are at all scientific.

1. DIFFICULTIES THE THEORY OF EVOLUTION MUST FACE

1. The first difficulty is that it has been forced to abandon entirely the theories of its founder, Darwin, and yet with no foundation in the way of premises still insists on holding on to his conclusion. Dr. James Harvey Robinson, Professor of History in Columbia University and an evolutionist, says in an article in *Harper's Magazine*, "Darwinism is dead because so much that was unknown to Darwin has since been discovered; and if he were now alive he would be the first to confess that his explanations appear to have little or no value today." Professor William Bateson, the distinguished biologist of England, a scientist of the first rank and an ardent evolutionist, in an address before the American Scientific Association in Toronto in February, 1922, said:

> It is impossible for scientists any longer to agree with Darwin's theory of the origin of species. No explanation whatever has been offered to account for the fact that after forty years no evidence has been discovered to verify his genesis of species.

2. A second difficulty in the way of the theory is to account for the origin of life. Life comes only from previous life. But at one time there was no life on the globe. At the beginning of things there must have taken place a wonderful event different from anything now going on, namely, the beginning of organic life. But would this not be a real Creation in the old-fashioned sense of the word? We cannot avoid this conclusion; and there is nothing in science or philosophy to indicate that this creation of the living from the non-living was confined to one mere speck of protoplasm. It is certain that it required a real creation to produce life from the non-living; and it is just as reasonable to believe that

this exercise of the creative power may have taken place in all parts of the earth at the same general time, as the Bible teaches. For if a Being saw fit to create life at all, why should He stop with one or two protoplasmic units? Either the one or the other would be a miracle not explained by the theory of evolution. There must be back of life and all that is in life something that is as big as anything that has come out of life. The mere chance development of life from a piece of dead matter is unthinkable, and if there was the power of an external Being behind it, it was not evolution at all. The theory of evolution assumes that at some time in the distant past there must have been spontaneous generation of life. Not only has nothing of that kind ever been found, but that it should be found is unthinkable. Out of nothing nothing comes, and even science admits this in its law of biogenesis. The first and greatest gap that the theory must leap is the gap between the living and the non-living. Darwin himself admits that the spontaneous generation of life is "absolutely inconceivable." His co-laborer, Alfred Russell Wallace, says, "The very first vegetable cell must have possessed altogether new powers"; and he adds, "Here we have indications of a new power at work." The Bible calls this power God; evolution calls it a question mark!

Connected with this generation of life is the mystery of the power of all living things to reproduce their kind. This universal fact, necessary to the continuance of every species, raises the important question, How did the power of reproduction originate? The very *first* organisms must have possessed this power or there would have been no more to follow. Where did it come from? Evolution cannot reply. It could not have come through evolution since the first organisms must have had it. Here again the doctrine of creation appears to advantage in comparison with a defective theory of evolution, for, as a prominent part of the inspired history of creation are the words, "Grass and herb yielding fruit after their kind." In other words, God Himself implanted in the very first plants and animals both the principle of life and the power to reproduce life after their kind.

3. Added to these difficulties is that of accounting for the origin of matter and force. These would seem easier to trace than the mystery of life, and yet the evolutionary theory has to assume their existence through eternity without even attempting to account for their origin. Where did matter come from, and force, and the tremendous heat necessary to keep matter in its gaseous state? Evolution is silent—of necessity.

4. The difficulty that evolutionists are striving hardest to meet, and so far unsuccessfully, is that of the origin of different species of animals. Before it was determined just what a species is, it was comparatively easy for anyone to declare, because he had discovered a plant or animal with some slight differences from its general kind, that he had discovered a new species. Among fossils, for example, paleontologists often called a fossil a different species just because it happened to be found in a different kind of rock from others just like it. Even among living plants and animals there is the same unscientific tendency. William Bateson, to whom we have referred, says in *Science Sketches*:

> Thus the common Channel Catfish of our rivers has been described as a new species not less than twenty-five times, on account of differences real or imaginary but comparatively trifling in value.

If there ever were such a thing as evolution, there should be no such thing as species at all, for there would be such constant crossing of different kinds that any classification at all would be impossible, and yet the species remain intact and entirely distinct through all these ages. For evolution to be effective, all animals must to a great extent be cross-fertile. Is there such a thing as a species, *i.e.*, families of animals that are never cross-fertile with any other family?

What a species is should be understood. And Professor Le Conte, in his *Evolution and Religious Thought*, sums it up in saying that species "is characterized by the power of individuals to produce beings like themselves, who are in their turn productive." That is, "if two kinds breed freely with each other, and the off-spring is indefinitely fertile, the kinds are called varieties, but if not they are called species." A new species, to prove itself such, must not alone show some new character which no ancestor possessed, but must show that new character as breeding true through generations. Otherwise, it is not a species but a freak of an old species. Here is an explanation from the noted Huxley himself:

> If you breed from the male and female of the same race, you, of course, have offspring of the same kind; and if you make the offspring breed together, you will obtain the same result; and if you breed from these again you will still have the same kind of offspring. There is no check. But if you take members of two distinct species, however similar they may be to each other, and make them breed together, you will find a check. If you cross two such species, then, although you may get offspring in the case of the first cross, yet if you attempt to breed from the products of that crossing (which are called "hybrids"),—that is, if you mate a male and a female hybrid, then the result is that in ninety-nine cases out of a hundred you will get no offspring at all.

This fact quoted from Huxley is admitted everywhere. The hybrid with which we are most familiar is the American mule. There seems to be some power jealously guarding the crossing of species intended to be separate.

It has been proved easily possible to produce varieties without number within the family of a species, but it has been found impossible in a single instance to cross the line of species. We see many varieties of dog, from the great St. Bernard to the tiny smooth-skinned terrier and all the varieties between that may be seen at a dog show, but in every case, as someone says, in every case it is *dog* and is recognized by his fellow dogs as such. No amount of cross breeding will make him anything but dog. The great weakness of the doctrine of change from species to species is still "the missing link" between any two species. Men like Luther Burbank have tried by every conceivable means to develop new species, and yet, notwithstanding remarkable results in the way of new varieties, it has been proved, first, that the barrier of species cannot be crossed; and, second, that every variety produced artificially, if left to itself, reverts in a few generations to the original type.

It may be claimed that we have not time enough within the limits of one or two generations to watch changes from species to species. Yet when we come to bacteria, germs, protozoa, we have a new generation every hour or so, so that in ten years time scientists can observe eighty-seven hundred and sixty generations of bacteria. Now no physician will admit that the germ of cholera can produce symptoms of diphtheria. There is no change in thousands of generations of species. In addition to this, symptoms of plague, diphtheria, etc., are identical today with those symptoms recorded by acute observers in ancient Greece and Rome. Even bacteria breed true through the ages. . . .

Now where does the theory of evolution stand when it is admitted that there has never yet been proved a single instance of a change, gradual or sudden, from one species to another? How could man have developed from a monkey or some unknown ancestor of a monkey if no change from one species to another has ever been found? "Why," say evolutionists, "we have found fossil remains of men who are infinitely inferior to men of the present time, and from whom our race has developed—men who are kin to the brute. We have found animals of the monkey family that have many points in common in their skeletons and skulls." But this claim brings forth a fifth difficulty.

5. If any fossil remains of man have been found, they have all been remains of *man.* The species has remained true. No fossil bones have ever been discovered of a being half-monkey and half-man. No "missing link" has been discovered between man and baboon, nor

between any two species of animals whatever. Fossils have been discovered of the ancestors of almost every animal, including monkeys and great apes. If there existed beings half-ape and half-man, why did the sand storms that buried the ancestors of these animals not also bury the skeletons of ape-men? Yet not one has been discovered though men have scoured all the out-of-the-way places of the earth in a mad scramble to find even one illustration. If even one existed, there must have been hundreds of thousands of them, as well as of the apes with whom they lived side by side. It should not be necessary to go to remote places to find them; they should be everywhere. Why does it happen that men searching for missing links stumble on those specimens, instead, that contradict their theory? Professor Branco says, "Palaeontology knows no ancestors of man." And even Professor Osborn, who is the foremost advocate of evolution both in the newspapers and in the Hall of the Age of Man in New York, admits, because of the lack of any iota of evidence that man descended from the ape, "Man is not descended from any known ape, either living or fossil." But, because he is unwilling, with others, to admit that he has been wrong through all the years in maintaining the doctrine of evolution, he puts forth the almost amusing claim that man must have been descended, not from an ape, but from some imaginary common ancestor of the ape and of man—an animal which never existed except in the wild imaginations of evolutionists, and of which no single fossil trace has ever been found. Great is the adaptability of science, so-called, to surmount insurmountable difficulties in order that it may save its face!

But we are all directed to fasten our gaze on the Hall of the Age of Man with "proof" of man's descent from a half-human ancestor. Here is the Piltdown Man, the Trinil Ape-Man, the Neanderthal Man, the Heidelberg Man, etc., etc. Here, they say, is proof before your eyes of your animal ancestry, and teachers and young pupils in schools are taken to that museum and are made to feast their eyes on these horrible-looking things in cages or glass cases and made to believe they are their ancestors. One would naturally assume that skeletons of all these beast-men had been discovered and placed on exhibition as perfect proof of man's animal ancestry. The facts are that practically all the bones discovered, and from which these beings have been fabricated, could be gathered in a market basket. There is no hint whatever in the exhibit that these skeletons are not bona fide, and yet consider the facts. Near Piltdown Common in Sussex Charles Dawson found some men digging and asked them to keep any bones they discovered. Some time later they showed him a piece of a skull, a small part of a parietal bone. Mr. Dawson looked at it, said it was a human skull and that "it looked as if it might be thirty thousand years old!" He might just as well have said one hundred thousand or one thousand since it was entirely guess work. Not days, but years later, near the same spot he picked up another piece of bone, and still later he came across some small bones and a canine tooth. He was an evolutionist, wanting to prove man's descent from an animal—keep that in mind! He *assumed* that these few bones found years apart were parts of the same animal or man, and he and Dr. A. Smith Woodward of the British Museum from those bones, that could be concealed in the palm of the hand, reconstructed the "Dawn Man" as they called him, and reconstructed him as they thought he *ought* to look to back up the theory of evolution! They do not tell that English scientists refused to admit that the cranium and jaw ever belonged to the same creature, and that it was proved that the tooth never was the tooth of a man, but of a dog, and even in a dog it did not belong to the lower jaw where these fabricators of ape-men had placed it so that the face might look ferocious, but in the upper jaw instead! It is not stated that the Piltdown Man, as fabricated, could neither breathe nor eat, as proved by Professor Keith...

6. Another difficulty to be surmounted is that geology, on which the evolutionists have counted greatly, has gone back on the theory to such an extent that it is impossible to tell by the kind of strata in which a fossil is found just what the age of that fossil is. . . The difficulty has been that fossils of a great variety of supposed ages have been found in the same strata, and also that some of the supposedly oldest strata have been found scarcely solidified as yet. Also in many cases covering large areas, the rocks have been found in exactly the reverse order of their supposed laying down—upside down, and that with no sign of erosion or wearing between the layers, all fitting tight—so doing away with the evolutionist's theory that such cases proved a "thrust fault" where a small layer had been turned in on itself like a wave and then remained in that way. This matter of geology must be studied by itself, for it is coming to be recognized that it is by no means an exact science, but rests on wrong theories of other days. Suffice it to say that the age of human fossils does not matter. Man is still man, and while unnumbered fossils of all other creatures have been found, geology has not yet turned up a single fossil of a cross between a man and any other animal.

7. One of the greatest difficulties evolution must face, next to the origin of life, is the origin of the moral sense. An evolutionist quotes, "Striving to be man, the worm mounts through all the spires of form." Would even the most ardent evolutionist admit his belief that the worm really aspires to be a man, and that that is the reason it evolves by natural selection or in any other way except through intelligent outside direction? When you leave a man's body and come to his moral self you have a problem far greater, from the evolutionary standpoint, than in man's physical self. Animals have no moral sense; no tiger ever lay awake at night worrying because it had killed another animal—and neither did an ourang-

outang. The leap from the non-moral animal to the moral man is a leap too great for evolution to take.

In thinking of all these difficulties the theory of evolution must face and solve, a feat it has never even begun to accomplish, the question rises in the mind of a Christian, was God anticipating this theory when no less than ten times in the first chapter of Genesis, in speaking of the reproduction of plants and animals of different species, He uses the expression, "After their kind?"

THE COMEDY OF EVOLUTION[1]

Mr. Alfred Watterson McCann has recently given us a distinctly up-to-the-minute book in its digest and collation of works treating of evolution[2] He has provided for the reading public a treasure house of quotations. Even a cursory perusal of the book leaves no doubt that its author has read through the literature of evolution thoroughly, and knows it as probably very few professed evolutionists do, except possibly teachers of biology, whose business it is to be constantly occupied with it.

The inevitable conclusion, after reading the book, is that the whole theory of evolution, as it exists in the available literature issued by scientists, is a sad jumble of contradictions, of serious disagreements over even essential elements, while the history of the theory is a succession of definite statements, made in the name of science, followed by just as definite withdrawals of assertions, also in the name of science, though some of these withdrawals were again withdrawn later, or seriously modified. Nothing sure seems to be left, except that the scientists want to hear, as a rule, no mention of creation or of a Creator.

---

[1] Excerpts from article by James J. Walsh, M.D., Ph.D., practicing physician and Professor of Physiological Psychology, Cathedral College, New York. *Catholic World.* 116: 66-75. October, 1922.

[2] *God or Gorilla: How the Monkey Theory of Evolution Exposes Its Own Methods, Refutes Its Own Principles, Denies Its Own Inferences, Disproves Its Own Case.* The Devin-Adair Co. New York.

This is the more amusing because all the suggested factors of evolution have been rejected, one after another, and the theory is left very much in the air. Natural selection, actually selecting, has not been observed, though we have waited patiently and worked assiduously for two generations to find it. Sexual selection is long in the discard. The inheritance of acquired characters has been proved a myth, yet the chasm between species remains just as unbridged as ever. In spite of all this, a few biologists, but with them a great many people who know little of biology, insist that they can explain the origin of living beings, though just how they are to do so remains as much of a mystery as ever. What is still more interesting is that apparently these good people do not realize that their adhesion to Darwinism is now merely a belief, and not at all a scientific conviction. They have simply handed in their acceptance of what, as Professor Morgan of Columbia declared some years since, has now become the dogma of Darwinian evolution, which they seem to feel that no scientist can refuse to believe in, under pain of major excommunication by his scientific friends.

Let us suppose a young historian with a sense of humor should set himself the task—say about 1960, in the second rising generation from now, just after the centenary of the publication of Darwin's *Origin of Species*—of finding out not merely the events, but the course of thought that preceded the Great War of 1914. . .

The first thing that will strike him because of his interest in finding out the possible sources of the Great War of 1914, will be the emphasis which was placed by the generation just before that war on the *"Struggle for Life."* The exaggerated significance given to it was due to Darwin's book. He called his volume *The Origin of Species,* but he did not discuss origins at all. He assumed an immense number and variety of living beings in existence, and supposed also the principle of variation.

Then he suggested that those that were unsuited to their environment and did not have it in them to make a successful struggle for life, dropped out of existence. The rest remained. His book should have been called by its secondary title, "The Preservation of Favored Races in the Struggle for Life." Indeed, Darwin wanted to call it so, but his friends persuaded him to leave the title, *The Origin of Species.*

The prominence given the struggle for life impressed a number of the younger biologists, and so the Darwinians, who always went much farther than Darwin himself, proceeded to create the impression that this principle applied also to human beings, and that only the men who were able to fight it out successfully against their environment and, above all, against the members of their own species, would survive. This was the famous "survival of the fittest." The principle was applied to nations as well as to individuals. . .

This principle of the supposed struggle for existence was a grim joke on humanity. It was presented to us as the gospel truth of science. A great many unthinking people took it at its face value. The nations of Europe went to war, persuaded apparently of its fundamental biological truth. Surely, a future generation will hold the scientists responsible for this.

Professor Cope of the University of Pennsylvania, used to say: "So far as that expression [the survival of the fittest] has any meaning, it is merely a tautology. It means that those who are fittest to live will live, and that, of course, is the assumption contained in the terms. If they are fittest to survive, they will survive." "What we are interested in," he used to add, "is not the survival of the fittest, but the origin of the fittest. How did the fittest to survive originate?" Of this, as I have said, Darwin told us nothing, because his book has nothing to say about origins, but only about survivals and the preservation of favored races in the struggle for existence. He did not emphasize the personal struggle between the members of the species, but all the younger biologists did, until actually a sort of mental delusion was created that they were studying origins. . .

About the time that Darwinism came of age, in the eighties of the last century, a practical joke was played upon the "struggle for life" by its step-mother, biology. Most Darwinians, feeling that the master, in his anxiety to be absolutely sure, had not gone nearly far enough, were loud in their declarations of what "the struggle" accomplished for living beings. It was just a question of making themselves, and the living beings that could struggle, accomplish their purpose. The little ancestor of the horse, about the size of the rabbit, or probably a little smaller to begin with, wanted to be bigger and to run faster. He wanted so much to run fast that he touched the ground in his eager haste only with the middle toe of each foot, and did this so constantly that gradually the other toes began to atrophy, and eventually disappeared. His anxiety to get larger made him lift himself up ever more and more, until, finally, he began to run on the toe nail of this middle toe, adding at least a part of a cubit to his stature, and this middle toe became a hoof. See how easy it is for the horse to create himself. We had a whole sheaf of these stories written for the edification of the young; to show them how anybody, who really wanted to, could just change his whole character and, of course, transmit all the changes that he thus acquired to his descendants. The giraffe lengthened his neck just by stretching upwards for the tender shoots at the top of the taller plants, and then passed on his gains to his young. How easy it all was!

In the midst of this idyllic presentation of the significance of the struggle for existence and its wonderful results, there came along, very *mal a propos,* a marplot named Weismann. He made it very clear that *acquired characters were not, and could not, in the very nature of* *things be transmitted.* Mankind had known this, but had somehow failed to apply it in the question of evolution. We knew that if a man lost his little finger early in life, his children would not be borne with a little finger missing. We would laugh at such an idea. Yet the little horse, having struggled and struggled to win the race that is only for the swift, modified his characteristics in various ways and then proceeded to transmit these characters to his off-spring and among them, above all, the incentive to further change. This, too, was transmitted, until the squirrel-like horse original became the Arabian steed of today. What is the use of looking for jokes when statements like this are lying around loose in what is called serious science?

Of course, the Darwinians would say this is Lamarckian, and not Darwinian. That is good enough as an excuse, but it will not hold for those who know the loose writing indulged in by many who thought themselves disciples of Darwin and who, in schools and through popular lectures, have shaped people's ideas with regard to the meaning of evolution. As a matter of fact, the evolutionists generally, and above all the Darwinians, admitted very grudgingly the truth of Weismann's teaching and were very slow to recognize its full significance. Even now, some of them haggle not a little over it, for if there is no transmission of the changes that take place in living things, how then can there ever have been any gradual improvement in the course of descent. Species would have remained just what they are, and indeed they do so remain as far as we have any evidence, for we have never been able to raise any intermediate species, and that is the crux of the whole matter. In 1880, when Huxley wrote on "The Coming of Age of Darwinism," he declared that, until the gap between species could be bridged, there was no question of any proof for descent, and here we are, forty years after that, without any more proof than he had, and with Weismann's non-inheritance of acquired characteristics staring us in the face.

In every other phase of popular evolution following Darwin's publications, there came the same sort of inconsequence. The existence of a great many "useless organs" in the human body (at one time they counted as many as two hundred of them, the spleen among them, because it can be removed without the organism dying), was supposed to be a very definite proof of evolution. These were vestiges of man's evolution from the animal. They had been left in his body because the process of evolution was not quite complete. Their presence was hailed as one of those happy accidents that serve to reveal nature's ways and her history to us.

I wonder if there ever has been a greater joke than this with regard to the useless organs. Most of these so-called *useless* organs are now considered to be among the most important in the body, so far, at least, as the physiology of man is concerned. Principal among them are the ductless glands, the thyroid, the thymus, the suprarenals, the hyphophysis. These were the *useless* organs of a generation ago, but are now known to be the great guiding organs of human functions. . .

Many ardent evolutionists seem to think that *man* was never considered *an animal* until Darwinism came. Apparently, they are convinced that up to that time no one had noted the close similarity between the skeleton of all the larger animals and of man, nor the wonderful resemblances betweeen the various organs of the mammals and of man. They seem to forget that when dissection of human bodies was forbidden in the old pagan days, when the pagans had such reverence for the body that they refused to permit human dissection,[1] animals were used for the study of anatomy. The organs of the pig were considered to resemble so closely those of man, that the anatomy of this animal was the favorite study of even such great physicians and scientists as Galen.

---

[1] In the middle ages there was abundance of dissection, and even the artists dissected very freely.

Almost as long as the memory of man runs. certainly as long as there has been any serious philosophy or psychology, man has been defined as a rational animal. Men have always been perfectly sure about the animal part, but, from time to time, they have had their doubts about the rational part, at least for the majority of men. That is the present position, but, surely, no one can think for a moment that we owe it to the evolutionists.

Darwin was one of the last men in the world who had the right to teach anything with regard to the origin or descent of man. He confessed, with no little regret, toward the end of his life that he had lost his appreciation for music and art and poetry, and felt that he had just become a machine for grinding out scientific opinions. The difference between man and the animals, consists more in the power to appreciate music and art and poetry than in any other quality that man possesses. Raymond Lullius once suggested, in the middle ages, that he might make a logic machine, and our invention of calculating machines of various kinds would seem to demonstrate that the old scholastic was correct in his surmise, but no one has ever thought for a moment that he could make a machine that would turn out original poetry and art and music.

One of the quietly humorous points about evolution is the underlying assumption of all evolutionists that living things begin low down in the scale and evolute upward. This is, of course, a contradiction of all our experiences in physical science. Our clocks run down, but they do not wind themselves up again. All our experience is with force gradually having less and less potential. The life force, however, according to evolutionists, acquires new energy, exhibits new powers and develops new resources as time goes on. As to how it does so, no explanation is afforded. It is just another one of these things that *must* be so. Why must it be so? Because evolution *must* be so. Why must evolution be so? Because we cannot think of anything else to account for things as they are or to explain their origin. Of course, if we cannot think of anything else, meaning we, the scientists, there cannot be anything else, for *we* would surely know it.

With the publication of Darwin's *Origin of Species* in 1859, many people were convinced that the explanation of the coming into existence of all the living beings had now been reached. Matter, through the influence of moisture and heat, acquired life, and then the principle of variation did the rest. Everything living varied from generation to generation, some upward and some downward, and those with the upward tendency, being more suited to their surroundings, were better fitted to exist, and remained in existence, while all the other things dropped out. The mystery of the universe was the easiest thing in the world. There was no need of creation or of anything, except the ordinary forces of nature, and they came into existence of themselves. Under the influence of some such impression, some matter was dredged from the bottom of the ocean, and immediately was declared to be the intermediate step between non-living and living matter, and was given the learned name of *bathybius,* which is Greek for deep life (how Greek does help to cloak ignorance!), and after that there seemed nothing more to explain. But. alas for Huxley, who was the sponsor for *bathybius* and who, I believe, gave it its name, the substance turned out to be something very different, and those who had believed in it became the laughing stock of the serious scientists of Europe.

About seven hundred years ago, dear old Friar Bacon declared that the most important factor for advance in knowledge is the readiness to say frankly "I do not know." When a man knows that he does not know, he is usually quite prepared to make investigations that will lead him to knowledge. On the other hand, Bacon declared that there were four grounds of human ignorance, four basic reasons why men do not advance in knowledge. These are: "First, trust in inadequate authority; second, a force of custom which leads men to accept without question what has been accepted before their time; third, the placing of confidence in the opinion of the inexperienced; and, fourth, the hiding of one's own ignorance with a parade of superficial knowledge." Professor Henry Morley, in the third volume of *English Writers,* after quoting Bacon's four grounds of human ignorance, said: "No part of that ground has yet been cut away from beneath the feet of students, although six centuries ago (Morley wrote over half a century ago), the Oxford friar clearly pointed out its character. We still make sheep walks of second, third and fourth and fiftieth-hand references to authority, still we are the slaves of habit; still we are found following too frequently the untaught crowd; still we flinch from the righteous and wholesome phrase, 'I do not know,' and acquiesce actively in the opinion of others, that we know what we appear to know. Substitute honest research, original and independent thought, strict truth in the comparison of only what we really know with what is really known by others, and the strong redoubt of ignorance is fallen."

MODERN BOTANY AND THE THEORY OF EVOLUTION[1]

During the long distracting years that followed his notable discoveries, Gregor Mendel (1822-1884) used to say, "Meine Zeit wird schon kommen." But he had been dead sixteen years before the world awoke to the importance of his experiments. However in our day the great truth that the characters of organisms are transmitted separately in heredity has become the great predominating influence in experimental biology. As Edwin Grant Conklin expresses it, "At present it is practically certain that there is no other kind of inheritance than Mendelian."

---

[1] By George McCready Price, Professor of Geology, Union College. *Princeton Theological Review.* 23: 51-65. January, 1925.

This principle of the separateness of the various characters of size, color, shape, etc., of the various organs and tissues of plants and animals, and their segregation and separate transmission in heredity, has proved a very enlightening idea when we attempt to understand the origin of the great diversities among plants and animals. And although Bateson has had to remind us that, "we cannot see how the differentiation into species came about; variation of many kinds, often considerable, we daily witness, but no origin of species," yet it has always seemed reasonable that this principle of Mendelian segregation has been one of the important factors in the multiplying of various types. The one essential point which we have not been able to explain, as Bateson has pointed out, is how the barriers of cross-sterility have been erected between these various mutants, or Mendelian segregates, which we can so easily imagine must have originated in the long ago from the ancestral types.

But it is as clear as sunlight that we must have these original types, these primal stocks, to start with. Mendelism gives us a very vivid picture of the shuffling of the cards, of the recombination of the separate characters in an almost innumerable variety of ways; but we must have these cards, or there could be no shuffling. The chemist can separate or combine the elements of his various compounds; but he never expects to get out of his mixtures anything that he did not put into them.

This fact has been a great stumbling block to many ardent students of organic evolution. They openly confess that they are becoming disappointed; for Mendelism is not getting them anywhere.

On the one side we have the more ardent evolutionists who "prefer to stick to speculative methods," blaming Mendelism for leading them into a cul-de-sac, a blind alley; on the other side we have the experimental biologists who remind their opponents and critics that this new tool of experimental breeding by Mendelian methods is "the only tool we at present possess which is capable of putting evolutionary theories to experimental tests." How much organic evolution can we get out of a situation like that?

But now comes J. P. Lotsy, the Holland botanist, and says that the only possible way to get new types is through hybridization—of course, with Mendelian segregation. The crossing of two distinct types will give us a new kind; there is no other way. As for the supposed evidence of geology or paleontology in support of organic evolutionary pedigrees, he has completely lost faith in it, and repudiates this method entirely. On this latter point he says: "Phylogeny, *i.e.*, reconstruction of what has happened in the past, is no science, but a product of fantastic speculations."

But as if to offset any objection to his statement, Lotsy goes on to say in the sentence immediately following the passage just quoted: "Those who know that I have spent a considerable part of my life in efforts to trace the phylogeny of the vegetable kingdom, will know that this is not written down lightly; nobody cares to destroy his own efforts."

But this new *Aufklärung* regarding the futility of all attempts to trace out imaginary lines of descent by means of the fossils, seems to have dawned also on the minds of some of the English botanists. For A. G. Tansley, in his presidential address before the Botanical Section of the British Association, at the Liverpool Meeting (1923), did not hesitate to say that he regarded recent developments in botany as making the search for common ancestors among the plants "literally a hopeless quest, the genealogical tree an illusory vision."

Professor A. C. Seward, of Cambridge University, informs us that "The present tendency is to discard the old-fashioned genealogical tree with its wonderful diversity of branches," as being in any respect a true method of representing the course of evolution. Because as he goes on to say, "a student who takes an impartial retrospect soon discovers that the fossil record raises more problems than it solves."

Professor F. O. Bower, of Glasgow University, in commenting on these recent developments in botany says: "At the present moment we seem to have reached a phase of negation in respect of the achievements of phyletic morphology, and in conclusions as to descent. . . . I believe that a similar negative attitude is also to be found among those who pursue zoological science."

Readers of this *Review* may remember an article of mine in a previous issue, entitled: "The Fossils as Age-Markers in Geology." The conclusion there reached was that the exact chronological distinctions between the various geological systems or formations, are not logically and scientifically established; and that the fantastic blunders upon which these alleged chronological distinctions have been founded, make but a poor foundation on which to build evolutionary theories of organic development. It is interesting to note that these English and Dutch botanists are approaching this latter conclusion, though by another road.

I am prepared to maintain that the reason why the fossil plants do "not present a uniform progression, but rather a series of diverse periods of vegetation, each with a character of its own," is because he [Scott] and the other paleobotanists have always had to take the geological "formations" as the zoologists have wanted to arrange them. The latter have had things too much their own way.

As I have repeatedly pointed out, in my *New Geology* and elsewhere, the whole arrangement of the "formations" into an orderly series is a purely artificial scheme, made up from scattered localities all over the globe, there being no place on earth where more than two or three of them are ever found together in any one vertical section. The geological series is like the card-catalog of a library; and although its main outlines have long been fixed, its details are even yet constantly manipulated and revised, so as to make them conform more nearly to the evolutionary theory. But this rechecking and rearrangement has been almost entirely in the hands of the paleozoologists; with the very natural result that their pets, the fossil animals, seem to "present a uniform progression," all right enough, but the plants have been almost completely disregarded. Hence Dr. Scott and his companion paleobotanists are having a hard time of it, a very hard time, and are quite discouraged in trying to work out any real scheme of evolution from the fossil plants.

If I were in the place of these paleobotanists, I should insist on having a fair show. Of course, the "geological series" is pretty well fixed up and stereotyped by this time, and it might be quite difficult now to get any proper adjustments made. If they could only have gotten in on the ground floor, in the days of Cuvier, Murchison, and Sedgwick, or even in the days of Hall, Agassiz, and Dana, they would not now have occasion to complain that they cannot get their fossil plants to "present a uniform progression."

Some unfortunate discoveries have lately tended to make matters even worse. For instance, in 1921 Professor Seward himself collected in Greenland and brought with him back to England a slab of Cretaceous rock, "showing one side of the slab of Dicotyledonous leaf, like that of a plane, and on the other the leaf of one of the old Cycads." This was too bad; for the paleobotanists are just naive enough to infer from this that this "old Cycad" and this modern plane tree must have actually lived contemporaneously. They should have taken a cue from the paleozoologists. Plenty of instances of "discordant" fossil animals have been found in similarly close contact, without the zoologists feeling at all obliged to draw the inconvenient conclusion that these "incongruous" animals had actually lived contemporaneously. Various devices have been worked out. A new generic name might be given to the one or the other, or to both; which would get rid of the difficulty quite well. Or an imaginary line of stratification could be drawn between the two fossils, one of them being in one "age" and the other in another. If when discovered the fossils had happened to be in the "wrong" order, the "older" being on top and the "younger" being below, a "thrust fault" would need to be worked out, to have the "older" pushed over on top of the "younger." Several other devices might have suggested themselves to the ingenious paleozoologist without his being driven to the crude, inept conclusion that the two fossils had actually lived in the same world together. Really, such unskilful handling of the situation by these fossil-botanists has made it doubly difficult for them to make their plants "present a uniform progression."

Still more recently Dr. A. C. Noe, Paleobotanist of the University of Chicago, has published an article entitled, "A Paleozoic Angiosperm," describing the discovery of a true Angiosperm stem in a coal ball from a coal seam near Harrisburg, Illinois. Not only is the fossil stem here discovered an undoubted Angiosperm, but the coal seam from which it was taken just as undoubtedly belongs to the "Pennsylvanian" subdivision of the Carboniferous system of geology. Furthermore, other fossil plant remains, which have been identified as Lepidodendroids belonging to the Carboniferous, were found in the same coal ball. This discovery was made after the make-up of the manuscript of Professor Scott's book, which may be given as the reason why no mention of it is found there.

This is a very astonishing discovery. Hitherto it has been supposed that Angiosperms are not found in any geological formations "lower" in the series than the Comanchean or lower Cretaceous. But this discovery at one jump takes us back through the Jurassic, the Triassic, and the Permian, into the Carboniferous. Truly, it is a very astonishing discovery, from the point of view of evolutionary geology.

In reality, there is nothing at all surprising about it. Why may not the Cretaceous Angiosperms have been living contemporaneously with the coal plants of the Carboniferous? Nobody has ever given us a glimmer of a scientific reason why they did not live contemporaneously, though in separated localities, in the ancient world, except the negative reason that we had never found them actually together in the same deposit. Now we have actually found them together. What prevents us from saying that the Carboniferous and the Cretaceous coal beds merely represent contemporary floras, from separated localities? There is absolutely nothing but an evolutionary theory, already hoary with age, but nevertheless a pure assumption, a mere theory, to forbid us saying that these two formations (widely separated in the classification) were actually living contemporary with each other. . .

In view of all this, we may well ask ourselves, "*Ubinam gentium sumus?*" Where in the world are we? What have these recent contributions to botany accomplished with respect to the ever-present problem of the origin of our plants and animals? What light do these recent advances throw upon the problem of organic evolution?

For one thing, these discoveries are helping more and more to show the absurdities of the current chronological distinctions between the various kinds of fossils. On account of these and other discoveries, the evolutionary type of geology is apparently in extremis. It seems quite unlikely that it can survive much longer. With its biological form of the "onion-coat theory," its "thrust faults" and its "deceptive conformities," it was fast becoming subject to the scoffs of the philistine fundamentalists; but now the orthodox paleobotanists have themselves entered the lists against the long-treasured traditions, and are making things very uncomfortable for the modern students of botany to continue believing the creed upon which all scientists have been nourished for the past two generations. For when the evolutionary form of geology breaks down, the whole theory of organic evolution tumbles with it; the biological phase of the theory collapsed long ago under the assaults of Mendel and his followers.

In the second place, these modern discoveries are helping to dissipate the age-old fable about "extinct species." This theory that all the fossil plants and animals belong to extinct types, and are only in a very remote and shadowy way connected with the living things of our modern world, has come down to us from the days of Buffon, "Strata" Smith, and Baron Cuvier. It has been hard to dispel this superstition, because it has been such a useful ally of Lyell's uniformitarianism and the organic evolution of Darwin, and because it has so long delayed the coming of the new catastrophism in geology, by keeping the world in ignorance of the thousands of fossil plants and animals which are essentially duplicates of those alive today. But the modern discoveries, especially in botany, are helping us to see that, if we will only make a reasonable allowance for the changed environment of climate which prevails in our modern world, great multitudes of the fossil forms are undoubtedly the real ancestors of species alive today on all of the five continents and in all of the seven seas. And with the establishment of this great basic truth, the ultimate triumph of the new catastrophism becomes as certain as tomorrow's sunrise.

In the third place, these discoveries seem to be bringing us already within measurable distance of the scientific establishment of a real creation, as the origin of our more familiar forms of plant life. This development in the situation ought to be as pleasing to the old-time friends of the Bible as it undoubtedly is annoying and perplexing to the standpat evolutionists.

Obviously great multitudes of what we term "species," both the Jordanian species and the groups called "Linnaean species," corresponding more to what are commonly called genera, have come about by Mendelian or other methods of segregation from the great primal stocks, which Guppy calls the great family groups. But back of all this, as Guppy and Willis declare, there must have been a sudden origin of these great groups by some method not now in evidence around us under this reign of what we are pleased to term "natural law."

As I have shown at length elsewhere, the prime idea of the evolution doctrine is uniformity, that the present is the measure of the past and the measure of all the past. The origin of plants and animals has not been different in any way from processes now going on around us; but the same laws and processes hold throughout all time, past, present, and future.

In contrast with this essentially pagan or atheistic theory, the Bible tells us that back at a period called "the beginning" forces and processes were manifested which then ceased and have since not been thus manifested. This is the doctrine of a completed creation, of which the Sabbath has given to the race as the memorial. In harmony with this the Epistle to the Hebrews tells us that "the works were finished from the foundation of the world" though Christ also said that His Father still worked and He Himself worked to sustain and perpetuate the creation which they had in the beginning brought into exstence.

This distinction between the origin of things by a real creation, and the present operation of "natural law" as sustaining and perpetuating what was originally created, is one of the most important, one of the most basic ideas of all Christianity. Fortified with this idea the Christian is never perplexed by all the confusion and turmoil of modern discussion; for he sees in radioactivity, in biology, and in other ways the steadily accumulating evidences that the whole theory of evolution is crumbling to pieces, and that a literal creation of all the great primal types of plants and animals, including man, is the only fact left for men who are acquainted with the progress of scientific discoveries in modern times. And the botanists are now coming along with their very helpful contribution. Let us hope that some of the zoologists will adopt similar methods and reach similar conclusions.

CALLS EVOLUTION ONLY MILLIONS OF GUESSES STRUNG TOGETHER[1]

It is not scientific truth to which Christians object, for the true science is classified knowledge, and nothing, therefore, can be scientific unless it is true.

Evolution is not truth; it is merely an hypothesis—it is millions of guesses strung together.

It had not been proven in the days of Darwin. He expressed astonishment that with two or three million species it had been impossible to trace any species to any other species. It had not been proven in the days of Huxley, and it has not been proven up to today. It is less than four years ago that Professor Bateson came all the way from London to Canada to tell the American scientists that every effort to trace one species to another had failed—every one.

He said he still had faith in evolution but had doubts about the origin of species. But of what value is evolution if it cannot explain the origin of species? While many scientists accept evolution as if it were a fact, they all admit, when questioned that no explanation has been found as to how one species developed into another.

---

[1] From argument prepared by William J. Bryan for the Scopes trial. *New York World.* July 29, 1925. p. 1, 2, 4.

DARWIN'S TWO LAWS

Darwin suggested two laws, sexual selection and natural selection. Sexual selection has been laughed out of the class room, and natural selection is being abandoned and no new explanation is satisfactory even to scientists. Some of the more rash advocates of evolution are wont to say that evolution is as firmly established as the law of gravitation or the Copernician theory. The absurdity of such a claim is apparent when we remember that anyone can prove the law of gravitation by throwing a weight into the air, and that anyone can prove the roundness of the earth by going around it, while no one can prove evolution to be true in any way whatever.

Chemistry is an insurmountable obstacle in the path of evolution. It is one of the greatest of the sciences: It separates the atoms—isolates them and walks about them, so to speak. If there were in nature a progressive force, an eternal urge, chemistry would find it. But it is not there. All of the ninety-two original elements are separate and distinct; they combine in fixed and permanent proportions.

Water is H_2O, as it has been from the beginning. It was here before life appeared, and has never changed; neither can it be shown that anything else has materially changed.

MANSION AND COTTAGE

There is no more reason to believe that the man descended from some inferior animal than there is to believe that a stately mansion has descended from a small cottage. Resemblances are not proof—they simply put us on inquiry.

As one fact, such as the absence of the accused from the scene of the murder, outweighs all the resemblances that a thousand witnesses could swear to, so the inability of science to trace any one of the millions of species *outweighs all the resemblances upon which evolutionists rely to establish man's blood relationship with the brutes.*

But while the wisest scientists cannot prove a pushing power, such as evolution is supposed to be, there is a lifting power that any child can understand. The plant lifts the mineral up into a higher world, and the animal lifts the plant up into a world still higher.

So it has been reasoned by analogy, man rises, not by a power within him, but only when drawn upward by a higher power. There is a spiritual gravitation that draws all souls toward heaven, just as surely as there is a physical force that draws all matter on the surface of the earth toward the earth's center. Christ is our drawing power. He said, "I, if I be lifted up from the earth, will draw all men unto me," and His promise is being fulfilled daily all over the world.

Ignorance of Evolution

Most of the people who believe in evolution do not know what evolution means. One of the science books taught in the Dayton High School has a chapter on "The Evolution of Machinery." This is a very common misuse of the term. People speak of the evolution of the telephone, the automobile and the musical instrument. But these are merely illustrations of man's power to deal intelligently with inanimate matter; there is no growth from within in the development of machinery.

Equally improper is the use of the word "evolution" to describe the growth of a plant from a seed, the growth of a chicken from an egg, or the development of any form of animal life from a single cell.

All these give us a circle, not a change from one species to another.

518,900 Animal Species

Evolution—the evolution involved in this case and the only evolution that is a matter of controversy anywhere—

is the evolution taught by defendant, set forth in the books now prohibited by the new state law, and illustrated in the diagram printed on page 194 of Hunter's *Civic Biology*. The author estimates the number of species in the animal kingdom at 518,900. These are divided into eighteen classes, and each class is indicated on the diagram by a circle, proportionate in size to the number of species in each class and attached by a stem to the trunk of the tree. It begins with protozoa and ends with the mammals.

Passing over the classes with which the average man is unfamiliar, let me call your attention to a few of the larger and better known groups. The insects are numbered at three hundred and sixty thousand, over two-thirds of the total number of species in the animal world.

The fishes are numbered at thirteen thousand, the amphibians at fourteen hundred, the reptiles at thirty-five hundred, and the birds at thirteen thousand, while thirty-five hundred mammals are crowded together in a little circle that is barely higher than the bird circle.

No circle is reserved for man alone. He is, according to the diagram, shut up in the little circle entitled "Mammals," with 3,499 other species of mammals.

Does it not seem a little unfair not to distinguish between men and lower forms of life? What shall we say of the intelligence, not to say religion, of those who are so particular to distinguish between fishes and reptiles and birds, but put a man with an immortal soul in the same circle with the wolf, the hyena and the skunk? What must be the impression made upon children by such degradation of man? . . .

Quotes Darwin as Giving Up Speculation on Man's Origin

Evolutionists do not feel it is encumbent upon them to show how life began or at what point in their long drawn-out scheme of changing species man became endowed with hope and promise of immortal life. God may be a matter of indifference to the evolutionists, and a life beyond may have no charm for them, but the mass of mankind will continue to worship their Creator and continue to find comfort in the promise of their Savior that he has gone to prepare a place for them.

Christ has made of death a narrow, star-lit strip between the companionship of yesterday and the reunion of tomorrow; evolution strikes out the stars and deepens the gloom that enshrouds the tomb.

If the results of evolution were unimportant, one might require less proof in support of the hypothesis, but before accepting a new philosophy of life, built upon a materialistic foundation, we have reason to demand something more than guesses: "We may well suppose," is not a sufficient substitute for "Thus saith the Lord."

If you would have an understanding of the sentiment that lies back of the statute against the teaching of evolution, please consider the facts that I shall now present to you. First, as to the animals to which evolutionists would have us trace our ancestry. The following is Darwin's family tree, as you will find it set forth on pages 180-1 of his *Descent of Man.*

> The most ancient progenitors in the kingdom of vertebrata at which we are able to obtain an obscure glance of marine animals, resembling the larvae of existing ascidians. These animals probably may rise to a group of fishes as lowly organized as the lancelot; and from these the Ganoides and other fishes like the Lepidosiren, must have been developed.
>
> From such fish a very small advance would carry us on to the amphibians. We have seen that birds and reptiles were once intimately connected together; and the Monotremata now connect mammals with reptiles in a slight degree. But no one can at present say by what line of descent the three higher and related classes, namely, mammals, birds and reptiles, were derived from the two lower vertebrate classes, namely amphibians and fishes.
>
> In the classes of mammals the steps are not difficult to conceive which led from the ancient Monotremata to the ancient marsupials; and from these to the early progenitors of the placental mammals. We may thus ascend to the Lemuridae; and the interval is not very wide from these to the Simiadae.

The Simiadae then branched off into two great stems, the New World and Old World monkeys; and from the latter, at a remote period, man, the wonder and glory of the universe, proceeded. Thus we have given to man a pedigree of prodigious length, but not, it may be said, of noble quality.

THE FIRST MAN

Note the words implying uncertainty, "obscure glance," "apparently," "resembling," "must have been," "slight degree" and "conceive."

Darwin, on page 171 of the same book, tries to locate his first man—that is, the first man to come down out of the trees—in Africa. After leaving man in company with gorillas and chimpanzees, he says, "but it is useless to speculate on this subject." If he had only thought of this earlier the world might have been spared much of the speculation that his brute hypothesis has excited.

On page 79 Darwin gives some fanciful reasons for believing that man is more likely to have descended from the chimpanzee than from the gorilla. His speculations are an excellent illustration of the effect that the evolutionary hypothesis has in cultivating the imagination. Professor J. Arthur Thomson says that "the idea of evolution is the most potent thought-economizing formula the world has yet known." It is more than that. It dispenses with thinking entirely and relies on the imagination.

On page 141 Darwin attempts to trace the mind of man back to the mind of lower animals. On pages 113 and 114 he endeavors to trace man's moral nature back to the animals. It is all animal, animal, animal, with never a thought of God or of religion.

THEOLOGY AND EVOLUTION[1]

The debate which has long been going on between scientist and theologian over the question of evolution shows that the theory of evolution is not without its religious significance. The conflict cannot be described simply as science *versus* religion, or Christianity *versus* evolution. For the term evolution has not distinguished sharply between the Christian and the non-Christian. Christians on either side of the debate agree that a true science and a true theology cannot conflict. But the strenuous controversy which has waged over this subject indicates clearly that the truth or falsity of evolution has a vital bearing on Christian faith. The purpose of this article is to show how evolution has entered the sphere of theology and influenced the discussion of the great theological themes.

---

[1] By David S. Clark. *Princeton Theological Review.* 23: 193-212. April, 1925.

I. EVOLUTION AND GOD

Recent years have witnessed new discussions of the doctrine of God

1. Pantheism is an evolutionary system throughout. And the menace of pantheism in theological thinking did not cease with Spinoza, nor with the aftermath of Kant's transcendentalism in the philosophies of the Absolute of Fichte, Schelling and Hegel. Pantheism, or a pantheizing philosophy, is a present danger; and perhaps always will be to the man who speculates on the nature of God. The late John Burroughs, a distinguished naturalist, was an out-and-out pantheist, and definitely ascribed all evidence of design and purpose in the world to a "cosmical intelligence." The doctrine of the divine immanence, so prominent in such discussions, is open to statements that blend the Deity in the universe. The doctrine has been expressed in a way that looks toward pantheism; and this bias marks much current discussion. All this obscures the personality of God. Against such a view the Christian theologian lifts a warning voice; for whatever obscures God's personality impairs human responsibility.

2. Another view traceable to evolutionary sources is that God Himself is but an imperfect, finite, and

developing deity. It is hard to see what is to be gained, in a logical consideration of the case, by such a contention. It is evident that a finite being cannot be eternal. Infinity of attribute is essential to infinity of being. If God is a developing deity each preceding age must necessarily place its circumspections about His being. This would soon land us in logical absurdities. Either we have a God that recedes in the abysmal past to the infinitesimal, to a virtual nonentity, or we have a demigod or a demiurge under some infinite, eternal, self-existent super-intelligence. And what have we gained? How quickly the logic of the case discards the developing deity for the eternal God.

3. Further we have the doctrine of pluralism, of which the late Professor James of Harvard was an advocate. This looks too much like a retreat toward the dualism of the old Persians, or even to the polytheism of the pagans. The view is philosophic rather than scientific; and its relation to evolutionary doctrine does not at first appear. The prodigality of forms in nature, the immense variety in types of life, the progress of the world as the resultant of innumerable conflicting forces, are alleged as suggesting in analogy in the unseen world if not a variety of causes for, and controls of, this one. But this argument for pluralism is offset by the evidence for the scientific unity of the world and its processes, the rigid conformity to type, the immensity of plan in the universe embracing all things from the highest to the lowest. The mind that intently considers these things will be duly impressed with the wisdom of the Scriptural injunction: "Hear O Israel, the Lord our God is one Lord."

4. Again, there are those who tell us that universal thought is God. This amounts to the denial of God. Man is then his own God. He possesses within himself all the powers that are needful and available for human activities. The supreme thing in life is the development

or evolution of the inborn potentialities. The discovery of these resident forces is the supreme revelation. After this a man's destiny is in his own hands. It sums itself up in the denial of God and the deification of man.

5. There are those who call themselves theistic evolutionists. Their evolutionary views may or may not have modified their conception of God. There are all grades of evolutionists. There are many to whose doctrine of God *per se* no exception could be taken. There are however two tendencies to which many yield. Either they lose God in nature and tend to pantheism, or put God so far back and so far off as to simulate deism. Either tangent is disastrous. The personality of God is obscured, or secondary causes infringe on the immediacy of God's being and power. The theistic evolutionist congratulates himself that he occupies a more strategic position than the materialistic. And this is true from the standpoint of religion and philosophy. But it is not true from the scientific standpoint. All the scientific objections to evolution, and they are many, bear against the theistic type as forcibly as against the materialistic. All the difficulties from paleontology, sterility of hybrids, Mendelism, and a score of scientific fields, are applicable to theistic evolution as well as to any other form of the theory. If men think that they can lightly surmount all obstacles by describing themselves as theistic evolutionists they can be easily undeceived. The theory of evolution has its difficulties even when the doctrine of God is conceded. This has not been sufficiently recognized by writers on the subject.

II. Evolution and Creation

Haeckel said: "With one stroke Darwin has annihilated the dogma of creation." Perhaps that is more than Darwin himself would have said, at least in his earlier years. However it shows the attitude of a large group of evolutionists toward creation. If there was no creation, the eternity of matter follows inevitably. That conclusion has its evident weaknesses. We will not discuss them here. That the present order is eternal is indefensible. That change takes place is undeniable. That every effect must have a cause is incontrovertible. But what causes evolution? Does evolution supersede or displace creation? Is evolution a method of creation as Lyman Abbott used to say? Or must creation be a fact before evolution can begin? If evolution is orderly change what changes? Must there be a substance in which the change takes place; and whence did it come? Can evolution account for itself not to say the whole universe? Even as to its secondary cause, if there be such, we get a variety of answers none of which is satisfactory to the scientists of the present day.

Lamarck, the father of modern evolution, said this cause, the underlying principle, was heredity transmitting accumulated changes. Investigators soon discovered the weakness of this position and demolished it. Increasingly scientists have ranged themselves against it, and Mendelism seems to have said the last word. Heredity has been eliminated as a basis of evolution because heredity accounts only for sameness and not for differentiation, and evolution can proceed only by differentiation.

Darwin based evolution on natural selection and the survival of the fittest. What a furore it made! Fifty years ago if a man did not assent to the dogma of Darwin he was written down as an obscurantist. But what has happened? Who now believes in natural selection as a basis of evolution? There is scarcely a second rate scientist so poor as to do it reverence. It left too much to chance; and this world is anything but a world of chance. Besides, if intelligent selection, tried out by Mendel and scores of others, cannot produce a new species, what probability remains that accidental selection could do so? At any rate natural selection belongs to the buried shades. This is not the declaration of the church, nor of a few conservative ministers, but of the leaders of scientific thought. Professor Bateson frankly admits it, but hopes that some other cause may be discovered, and says: "We walk by faith and not by sight."

"Resident forces" is a term being used by many, but what is that but another appeal to heredity? The same objection arises, namely, the difficulty of accounting for transmutation by a process of heredity, which gives sameness, not difference. Resident forces require a cause and intelligent direction, so that the materialistic evolutionist at least can find no comfort in this plea. Moreover resident forces have already established a law of uniformity in the matter of reproduction according to the Biblical phrase "after its kind." Every field of grain, every garden is standing evidence that second causes rigidly adhere to conformity to type. All speculative arguments need the support of observed historical instances, or of empirical tests, and these seem to be lacking in this case. Not longer than a year ago Julian Huxley complained of the evolutionist's bias to speculation and his neglect of experimental proof. The "laws of nature" which were recently supposed to account for the universe, are now known to explain nothing in themselves; so "resident forces" is a term the vagueness which covers a multitude of assumptions.

But what shall the scientist put in place of heredity and natural selection? We might modestly suggest, the immanent God. It would at least be as good a postulate as any of the former. But would that be scientific? Yes, unless an intelligent and immanent personality is inferior to an intangible and impersonal law. If this seems like creation, it is, for the present, the only alternative. A present God as against an absentee God has been the demand of some modern writers not altogether conservative.

The ablest paleontologists testify that species arrive with no known antecedents in the lineal descent, by a sort of *per saltem* arrival. If this is so, then such an arrival demands a sufficient cause, and such a cause as the present theory of evolution does not supply. If writers on evolution would assume that each species has developed from its own primordial germ, which germ was the creation of God, there could be little objection to such a theory. That this view receives so little attention from writers on evolution is somewhat remarkable unless, indeed, it does not lend itself sufficiently to the materialistic proclivities of this age. For this, as is readily seen, points toward creation. But when all is said, creation is the fact from which the mind of man, with all its meanderings, cannot escape. But it is needful to remark that second causes are not the refutation of a first cause; and whether evolution is true or not, a Creator is a logical necessity to a rational explanation of the universe.

Evolution and Scriptures

The Christian theologian builds his case and stakes his cause on the Scriptures. To him they are the word of God, "the only infallible rule of faith and practice." What they say is of supreme authority because it is the word of God. Hundreds of times the Scriptures say: "Thus saith the Lord;" "The Lord said" thus and so; "The word of the Lord came" etc. The Scriptures represent themselves as being the word of God. If we cannot believe their testimony about themselves, we cannot believe them on any other subject. If they are trustworthy witnesses, of which there is abundant proof, then we must believe what they say of themselves. That is the only logical conclusion. If the Scriptures are not true we have no Christianity, no Christ, no Saviour, and no salvation. Christianity cannot survive without the record and message of the Scriptures. Christianity and the Scriptures will stand or fall together. There is an effort in some high quarters to "free" Christianity from its historical facts and records. It is logical and moral suicide. Whoever or whatever makes the Scriptures false, or faulty, or even doubtful, destroys the saving faith of man and dims his hope as he faces death and eternity. I have never seen beyond the veil. No voice has spoken to me from beyond the tomb. No messenger has come back from "that mysterious bourne from which no traveler returns" to tell me what lies behind the darkness of death and the grave. If there be no word of an eternal and omnipotent God no strong assurance resting on a "thus saith the Lord" as I stand on the brink of the grave, then to me, as to Thomas Hobbes, death is but a leap in the dark. Only the infallible word of the infallible God is sufficient. That is what the Scriptures mean to me. That is what they ought to mean to every man as he stands in the face of earthly dissolution.

How does evolution effect belief in the veracity and finality of the Scriptures, and the consequent hope of living and dying man? Not every evolutionist discredits the Scriptures. Indeed many regard them as a revelation of the Divine Will under some theory of inspiration. Others accord them a *pro tanto* acceptance. But others again, perhaps the large majority, surely all the Haeckel type, repudiate them *in toto*. Even the most conservative evolutionists we know, take the Scriptures with a few "grains of salt." So that, when all is said, after the fairest estimate, the actual result of the evolutionary propaganda is a decidedly lessened estimate of the importance and authority of the Scriptures. Rightly or wrongly, consistently or inconsistently, justifiably or otherwise, this is the indisputable fact.

CAN EVOLUTION AND THE SCRIPTURES BE HARMONIZED

As far as materialistic or naturalistic evolution is concerned the answer must be a decided no. In behalf of theistic evolution the attempt has frequently been made; but it cannot be said with entire success. But it must not be assumed that, even if such a harmony could be established, this would prove evolution to be true. The proof of evolution must rest on positive grounds. It is not a mere choice between a naturalistic uniformitarianism and a supernaturalistic uniformitarianism; but whether even the latter is true. As long as evolution defines itself as "development," "history," or "orderly change"—as long as evolution confines itself to the limits of species, one need hardly enter the lists. But when evolution trangresses these limits, and affirms the transmutation of species, deriving all sentient being, the race of man, body and soul included, from a primordial germ, then discussion arises and opposition ensues. Transmutation is of the essence of evolution—is really what evolution means. There may be room for difference of opinion as to the limits of species, some more, some less, inclusive, as the case may be; but that there are such limits the sterility of hybrids and the laws of Mendelism conclusively show. The laws of nature show a very decided respect for the limits of species, and to this the first chapter of Genesis bears its witness: "And God said: Let the earth bring forth grass, the herb yielding seed, and the fruit tree yielding fruit after its kind whose seed is in itself. . . . And the earth brought forth grass and herb yielding seed after its kind, and the tree yielding fruit whose seed was in itself after its kind" (Gen. i, 11, 12); "And God created every living creature that moveth—after its kind, and every winged fowl after its kind" (vs. 21); "And God said: Let the earth bring forth the living creature after its kind, cattle and creeping thing, and beast of the earth after its kind. . . And God made the beast of the earth after its kind and cattle after their kind and every thing that creepeth upon the earth after its kind" (vss. 24, 25). How careful the Scripture is to stress the words after its kind. These are statements for the Christian and the scientist to ponder. And there are many who hold that the physical law of the inviolability of species and these express statements of Scripture are cogent and conclusive evidence that transmutational evolution is in harmony neither with the Scriptures nor with the laws of nature.

PART II

TEACHING EVOLUTION IN SCHOOLS AND COLLEGES

THE CONTROVERSY

EVOLUTION FORTY YEARS AGO[1]

Forty years ago, while Woodrow Wilson was a student at the Johns Hopkins University, which was then our most conspicuous center of scientific research, he was deeply interested in a heresy trial that was attracting wide attention in church circles, in the newspapers and in educational institutions. The man on trial was the Rev. James Woodrow, D.D., the uncle for whom Woodrow Wilson was named. Dr. Woodrow was a professor in the South Carolina College and Theological Seminary at Columbia, S.C., this being a Presbyterian institution. It devolved upon this southern scholar to give courses in the natural sciences as related to revelation. He was charged with presenting the theory of evolution in undue sympathy with the Darwinian school, and in violation of orthodox teaching on the origin of man and the creation of the world. The trial was a protracted one, and it holds its place in the annals of American education and theology. Dr. Woodrow was found guilty under the charges, and his career at the South Carolina institution seemed to have come to an end. His loyal nephew was indignant and the scientific men of the country were scornful.

This trial occurred in 1884, and those who care to look it up in the libraries will find ample accounts of it in the newspapers and the periodical literature of that year. In 1885, however, Dr. Woodrow was notified that the Presbyterian synods having ultimate control of the seminary at Columbia had refused to sustain the local verdict of the previous year, and that he was entitled to his teaching chair and his emoluments. The case seems to have been reopened in the following year, and Dr. Woodrow's connection with the seminary ceased, but in due time he became president of the State College and continued to serve as a professor of geology and natural science, retiring in 1897, after which he filled many important business posts, while retaining his connection with learned societies at home and abroad. In his youth he had studied science under Agassiz at Harvard and under Bunsen at Heidelberg, receiving the degree of Ph.D. in that German university. He died in 1907, after his distinguished nephew had for some years filled the office of president of Princeton University. Although Princeton, itself, was a stronghold of Presbyterian orthodoxy, Woodrow Wilson encountered no opposition in upholding the university's entirely liberal attitude toward modern science, which is still maintained.

---

[1] From *Review of Reviews*. 72: 3-11. July, 1925.

Those who believed in giving wise and mature teachers the right to use their own discretion in presenting scientific subjects to their pupils had naturally rejoiced in the firm stand of Dr. Woodrow, and they were optimistic enough in 1885 to believe that controversies of that particular kind in the United States would not survive the nineteenth century. A group of American scholars and scientific writers, working in close accord with such English expositors of scientific thought as Huxley and Tyndall, had dominated the American Association for the Advancement of Science. Attempts of the theologians to beat down the new scientific opinions by appealing to the Book of Genesis as definite and literal in setting forth the order of creation, and the nature and origin of man, were generally unsuccessful in colleges and universities, and among educated people. Dr. John W. Draper, the great scientist and teacher of New York University, published in 1874 his famous book on the *History of the Conflict between Religion and Science.* He was teaching in a Presbyterian atmosphere, but held his advanced ground without flinching. Dr. Andrew D.

White, president of Cornell University, writing from the standpoint of the historical scholar, devoted many years to the study of the relations between the dogmatists of theology and the leaders of scientific progress, publishing in the middle seventies a volume that afterward grew into his masterly work (1896) entitled *A History of the Warfare of Science with Theology in Christendom.* While Cornell University was still in its opening years, attacks were made upon it as a center of irreligious scientific teaching. In an address at Cooper Union, New York City, in 1875, Dr. White dealt with the question of the age-long friction between dogmatic theology and scientific research; and it was this lecture, then published in the New York newspapers, that was expanded later until it culminated in the author's monumental work cited above.

It was supposed that science had gained its full freedom to investigate, to report its findings, and to set forth theories and hypotheses. As compared with what is yet to be known, it is probably true that science has made only a limited beginning. Galileo, in the year 1632 brought out his book entitled *Dialogues on the Systems of the World,* after which he was indicted, condemned, and sentenced to detention and other penalties, including suppression of his book, by Pope Urban VIII at Rome, because he had ventured, as a result of his studies, to announce the truth that the earth is a spherical body revolving around the sun, and not the four-cornered, flat, and immovable affair that theologians held it to be. Ever since that time astronomers have been adding to the sum total of their knowledge of the universe. The nebular hypothesis helps some minds to give a logical arrangement to certain facts that seem to have been fairly well proved as regards the solar system; but there is nothing sacred about this particular hypothesis, or any other.

The sciences of physics, chemistry, and biology are making constant advances, and within the technical areas of those subjects new hypotheses from time to time are succeeding those that have served their purposes. Bacteriology has revolutionized the science of medicine and the art of healing; but the wisest men working in these fields of research are modest as they realize how little they know in comparison with what may yet be discovered. It would be too much to expect that each grown-up individual in a great country like ours should be capable of exercising individual judgment on all questions that enter into religious, or political, or scientific controversy. The great public will continue to defer to trusted leaders. The only wonder is that we have gone forward so well, and that the leaders are so much less bitter in their disputes than in former periods. There is less of dogmatism and more of tolerance. It should be admitted that scientific dogmatists can at times be almost or quite as intolerant and narrow as the heresy hunters of the rigid theological creeds. Liberty of thought and teaching is, in the main, fairly well established in the twentieth century. It is not, however, so completely vindicated as the young men of Woodrow Wilson's student days, forty years ago, supposed that it would be by this time—a hundred years after the death of Thomas Jefferson.

It would be difficult and perhaps useless to try to explain just why the legislature of Tennessee should have waited until now before passing a law prohibiting the teaching of the theory of evolution in all schools and institutions supported by the taxpayers. Perhaps Mr. Bryan has had something to do with current phases of the "fundamentalist" uprising that is not confined to one state but is evident in many. It was Mr. Bryan's campaigning previous to his nomination for the presidency in 1896 that explained in part the almost frenzied fanaticism with which the south and west accepted the dogma of free silver at the ratio of sixteen to one. Of late, Mr. Bryan has been crusading against evolution, and in behalf of the literal acceptance of the Old Testament as an infallible teacher of science and of history.

As recently as March 23 of the present year, Governor Austin Peay signed a bill that had passed both houses of the legislature prohibiting the teaching of evolution in the public schools, and specifically endorsing the story of the creation of man as taught in Genesis. In Kentucky, last year, a similar bill was defeated by a single vote in the Senate, after it had passed the other house.

It was stated that the defeat of the bill in Kentucky was due to the determined stand taken by the educational authorities of the State University in public addresses. It is not quite clear why the Tennessee bill did not meet with more outspoken opposition. It should be explained at once that it does not affect higher institutions that are supported by endowments, but only those that are a part of the state school system. Publicity given to a test case that is about to be tried in Tennessee has diverted attention from the fact that similar legislation has been enacted in Oklahoma and that administrative school bodies in several southern states are declining to employ teachers who uphold the theory of evolution. A summary prepared by a scientific body states that the movement against the teaching of evolution in schools has assumed active phases in at least fifteen states, with campaigns beginning in a number of others. Certain individuals in the town of Dayton, Tennessee, which is the county seat of Rhea County, decided in May to test the constitutionality of the new law. A young teacher in the county high school, J. T. Scopes by name, was charged with having violated the new law, and he was indicted by a local grand jury on May 25.

The indictment states that Scopes had taught "certain theories that deny the story of the divine creation of man as taught in the Bible, and did teach instead thereof that man has descended from a lower order of animals." The judge read the first chapter of Genesis to the jury and gave instructions which made the indictment inevitable, although the governor is reported to have said when he signed the bill that it probably never would be applied.

The Tennessee situation is due perhaps to the way in which text-books are written, rather than to the personal views of teachers. School authorities are now busily engaged in Tennessee, as elsewhere in the south, in scrutinizing scientific text-books in order to exclude those that oppose the beliefs of the so-called fundamentalists. Young Mr. Scopes seems to have offended the majesty of the law through a merely routine use of a text-book that had been accepted and was already in use, without any reference to his somewhat recent connection with the county high school. Professor Mims, of Vanderbilt University, at Nashville, has been showing the practical difficulty of censoring scientific works. . .

The Bryan position is quite simple, and seems plausible on its face. The people who pay the taxes that support the schools, says Mr. Bryan, have a right to say what shall be taught in the schools; and their only way of saying it is through their representatives in the legislature. Mr. Scopes as an individual, says Mr. Bryan, is at perfect liberty to believe in evolution; but in his capacity as a teacher in the schools he must obey the law and be careful not to flout Genesis. The defenders of Mr. Scopes will attempt to uphold the right of scientific research and of free speech and discussion; and will presumably try to show that the Tennessee law is in its essential nature a violation of constitutional privileges. Public sentiment in Tennessee is so strongly opposed to scientific hypotheses that would seem to be in conflict with Scriptural teaching that there is no real danger that public school boards will employ teachers who would flagrantly offend the opinions and consciences of the community. This is what the governor meant, presumably, when he said that the law would not have to be applied.

The leaders of science have by no means agreed upon any exact presentation of evolutionary doctrine that they would insist upon administering to high-school pupils in Tennessee. There does not seem to be much more reason for a crusade on one side of this subject than for a crusade on the other side. But attempts to interfere with the freedom of teaching are as foolish as they are futile. Everybody who associates with his fellowmen is at once a learner and a teacher. People acquire some of their learning in the schools, but most of it elsewhere. Those young people in Tennessee who have scientific aptitudes and tastes will read scientific books and form their own opinions. Their religious faith will not be of much value if it is to be affected by some allusion that a school teacher may or many not make to Darwinian theories. Attempts to interfere with good teachers on the ground that they are protectionists or free-traders, or of this or that church connection, have been quite generally abandoned as silly. It is not practicable to encourage freedom of thought and speech everywhere else, and to discourage it in school rooms. Wise teachers are those who help their pupils to learn how to think for themselves. Since it is impossible to check the processes of learning, which are the really important thing, it is only a waste of effort to try to limit freedom in the processes of teaching. Good teachers are greatly to be desired, and need no interference. It is the duty of legislatures to provide more liberally for the encouragement, training, and selection of really competent teachers. It is hardly likely that the debate at Dayton, Tenn., will result in strengthening the kind of fundamentalism that Mr. Bryan advocates. Nor is it to be expected that it will do much to enlighten the public mind on so complicated and difficult a subject as is suggested by the word evolution.

THE SCOPES TRIAL[1]

DAYTON, TENNESSEE, JULY 21, (A.P.). John Thomas Scopes, science teacher of the Rhea County High School here, was arrested May 5 charged with violating the

---

[1] From *New York World.* p. 2. July 22, 1925.

Tennessee statute prohibiting the teaching of evolution theories in the public schools. He was given a preliminary hearing and held for action by the Grand Jury. The Grand Jury in special session May 25 returned a true bill against the twenty-four-year-old school teacher, and Judge Raulston called a special term of the Rhea County Circuit Court for July 10 to hear the case.

The trial occupied part of eight court days but only four witnesses testified before the jury.

An effort by the defense to offer the testimony of scientists and Biblical scholars was denied by the court, Judge Raulston excluding all such testimony from the jury but admitting it to the record.

The case was marked by frequent clashes between Williams Jennings Bryan of the prosecution counsel and Clarence Darrow for the defense. Mr. Darrow called Mr. Bryan "the leader of the Fundamentalists" and admitted that he (Darrow) was an agnostic. These widely separated views brought many arguments.

NEW INDICTMENT RETURNED

The first day of the trial saw the empanelling of a new Grand Jury, the returning of a substitute indictment, and selection of the trial jury.

Mr. Darrow, conducting the examination for the defense, asked the veniremen about their church affiliations and their views on the evolutionary theory. Eleven of the men finally chosen were church members, and all professed to know little of science or evolution.

The court adjourned from Friday to Monday, on which day the defense motion to quash the indictment was entered and argued. The motion attacked the indictment as vague and the Anti-Evolution Act as unconstitutional, citing articles of both state and United States Constitutions.

The third day of the trial was taken up in waiting for the court's ruling on the quashing motion. Its length necessitated several hours for typing. When Judge

Raulston was ready to deliver his decision the reading was postponed until the following morning when he was informed that a report forecasting his ruling had been distributed over the country.

The court's refusal to quash the indictment, announced the following morning, was in accord with the expectations of counsel and court observers. The trial then progressed to the hearing of testimony by state's witnesses.

THE STATE'S CASE

For about two hours the jury heard testimony from Walter White, County Superintendent of Schools and prosecutor in the case; from two recent students of the defendant and from F. E. Robinson, chairman of the Rhea County School Board.

The gist of the prosecution's evidence was that Professor Scopes had taught in the local high school biology class that all life had come from a single cell and that man had descended from a lower form of life.

Witnesses asserted that the defendant had admitted that he could not teach the textbook in use without violating the law.

When the state rested, after hearing four witnesses, defense counsel called to the stand Dr. Maynard M. Metcalf, zoologist of Washington, Baltimore and Oberlin, Ohio, the first of a group of scientists sworn in to testify for the defense. As soon as counsel asked the witness about evolution the state objected to this evidence as incompetent, launching an argumentative battle which consumed the rest of the day and all of Thursday's sessions.

The prosecution insisted the sole issue was whether Scopes had taught evolution in violation of law.

Judge Raulston delivered his decision on the expert testimony issue Friday morning before a packed and breathless courtroom. He affirmed the state's position and excluded the testimony of experts on science and the Bible from the jury.

DARROW'S CONTEMPT OF COURT

A scene of disorder followed this ruling which was apparently unexpected by the defense. Mr. Darrow in tones which disclosed his displeasure declared to the court that the defense would "protect its rights in a higher court." When the Judge suggested that he "hoped" Mr. Darrow did not intend to reflect upon the fairness of the court, the Chicago attorney replied: "Your Honor has the right to hope."

Monday's sessions developed two sensations. The court cited Darrow for contempt, and he satisfied the court by a full apology; William Jennings Bryan was called to the stand by the defense and questioned as to his belief in the Bible.

The final surprise came today when, Bryan's testimony having been excluded, the case was submitted to the jury virtually without argument. Scopes was fined and an appeal was noted.

SCOPES CONVICTION STANDS; DEFENSE FAILS TO FILE BILL[1]

Knoxville, Tenn., Dec. 8.—The famous Scopes evolution case is apparently finished in so far as the courts of Tennessee have anything to do with it, and John Thomas Scopes, the offender, will have to pay a $100 fine for violation of the State Anti-Evolution Law, it is believed.

At the last term of the Supreme Court, held in Knoxville, Scope's counsel received until November 30 to file a bill of errors, their bill of exceptions having been thrown out because of failure to file it within the time limit. It now appears that the counsel have failed to file the bill of errors and the case will automatically come to an end by an affirmation of the judgment of the lower court.

A taxpayer's suit is pending in Federal court in which the constitutionality of the act is attacked. What disposition will be made of this is not yet known.

[1] From *New York Times*. p. 1. December 9, 1925.

ANTI-EVOLUTION LEGISLATION IN THE VARIOUS STATES[1]

Tennessee

The text of the law under which the Dayton suit is brought is as follows:

> An act prohibiting the teaching of the evolution theory in all the universities, normals and all other public schools of Tennessee, which are supported in whole or in part by the public school funds of the state, and to provide penalties for the violations thereof.
>
> Section 1. Be it enacted by the General Assembly of the State of Tennessee, That it shall be unlawful for any teacher in any of the universities, normals and all other public schools of the state which are supported in whole or in part by the public school funds of the state, to teach any theory that denies the story of the divine creation of man as taught in the Bible, and to teach instead that man has descended from a lower order of animals.
>
> Section 2. Be it further enacted, that any teacher found guilty of the violation of this act, shall be guilty of a misdemeanor and upon conviction, shall be fined not less than one hundred dollars ($100.00) nor more than five hundred dollars ($500.00) for each offense.
>
> Section 3. Be it further enacted, That this Act take effect from and after its passage the public welfare requiring it. Passed March 13, 1925. Approved: March 21, 1925.

Florida

The following joint resolution was passed by the Florida legislature in 1923:

House Concurrent Resolution No. 7

> Whereas, the Constitution of the State of Florida expressly states in section 6 of the Declaration of Rights that, "No preference shall be given by law to any church, sect or mode of worship, and no money shall ever be taken from the public treasury directly or indirectly in aid of any church, sect or religious denomination, or in aid of any sectarian institution, and
>
> Whereas, the public schools and colleges of this state, supported in whole or in part by public funds, should be kept free from any teachings designed to set up and promulgate sectarian views, and should also be equally free from teachings designed to attack the religious beliefs of the public, Therefore,

---

[1] From *Science*. n.s. 61: sup. x, xii. May 29, 1925.

> Be it Resolved by the House of Representatives, the Senate Concurring:
>
> That it is the sense of the Legislature of the State of Florida that it is improper and subversive to the best interest of the people of this State for any professor, teacher or instructor in the public schools and colleges of this State, supported in whole or in part by public taxation, to teach or permit to be taught atheism, or agnosticism, or to teach as true Darwinism, or any other (sic) hypothesis that links man in blood relationship to any other form of life.

Kentucky

In 1921 a bill forbidding the teaching of evolution in public schools and universities under penalty of a heavy fine and jail sentence, was introduced into the lower house of the Kentucky legislature, and after a hot fight was defeated by a vote of 42 to 21.

North Carolina

In April, 1925, Representative Poole introduced the following resolution into the lower House:

> Resolved by the House of Representatives, the Senate concurring, that it is the sense of the General Assembly of North Carolina that it is injurious to the welfare of the people of North Carolina for any official or teacher paid wholly or in part by taxation to teach or permit to be taught as a fact either Darwinism or any other evolutionary hypothesis that links man in blood relationship with any other form of life.

The bill was referred to the Education Committee which reported unfavorably. It was brought to the floor of the house by a minority report and defeated by a vote of sixty-four to forty-seven.

In January, 1924, the High School Text-book Committee at the suggestion of Governor Morrison struck from the list of school books two well known works on elementary biology, because, as stated in the press, of their containing matter on evolution.

South Carolina

In 1921 a rider was attached to the general appropriation bill by the senate of the South Carolina legislature providing that:

> No moneys appropriated for public education or for the maintenance and support of state-supported institutions shall be used or paid to any such school or institution teaching, or permitting to be taught, as a creed to be followed, the cult known as "Darwinism."

Senator Miller, who introduced the proviso, explained that it applied only to "Darwinism" and not to such theories of evolution as are advocated, by Lamarck Bergson, Osborn and others. The amendment passed the senate without opposition but was stricken out of the bill by the joint committee.

California

In 1924 a group of Fundamentalists protested to the State Board of Education against the use in the high schools and junior colleges of text-books teaching evolution. The board referred eleven text-books on general science, biology, zoology and astronomy to a committee composed of the presidents of nine California universities and colleges. The committee found no fault with the books and reported in part as follows:

> In our opinion, these books have treated the subject with moderation and circumspection. There appear to be no statements derogatory to the Bible, and in the few instances in which the possible bearing of evolution upon religion is discussed at all, the writers have taken special pains to assure the readers that there is no conflict between science and religion. Evolution is presented as a theory, and not as an established fact, although it is stated here and there that the theory of evolution is commonly accepted by scientific men, and that is true.
>
> The text-books before us are concerned with presenting scientific facts and theories of which every person with any pretense to an education in the subject or subjects treated should be informed.

EVOLUTION AND INTELLIGENT FREEDOM[1]

The agitation in the United States over the teaching of evolution is attracting such wide-spread interest that it has been proposed to build a stadium to accommodate twenty thousand people for the trial of J. T. Scopes, a Tennessee high school science teacher, for having taught the truth of evolution in defiance of the state law. The trial is to open on July 10. The charge of the judge to the grand jury began by reading the first chapter of Genesis as the account of creation which Tennessee teachers must adopt. He pointed out that part of the value of education is mental discipline, and that flagrant defiance of the law by the school authorities would not be wholesome influence in the state. He insisted that the integrity of the law must be upheld. The main issue, however, will be decided by the Federal court in its decision as to the right of a state to prohibit the teaching of fundamental philosophical principles.

---

[1] From *Nature.* 116, sup.: 69-70. July 11, 1925.

The defense of evolution has been undertaken by the American Association for the Advancement of Science, which has appointed a committee of three distinguished biologists, Professor E. G. Conklin, Professor of Biology at Princeton, Dr. C. B. Davenport, Director of the Station for Experimental Evolution, Carnegie Institution of Washington, and Dr. H. F. Osborn, president of the trustees of the American Museum of Natural History, New York, to prepare a resolution upon the subject. The resolution, which has been adopted by the Council of the Association, is a follows:

(1) The Council of the Association affirms that, so far as the scientific evidences of the evolution of plants and animals and man are concerned, there is no ground whatever for the assertion that these evidences constitute a "mere guess." No scientific generalization is more strongly supported by thoroughly tested evidence than is that of organic evolution.

(2) The Council of the Association affirms that the evidences in favor of the evolution of man are sufficient to convince every scientist of note in the world, and that these evidences are increasing in number and importance every year.

(3) The Council of the Association also affirms that the theory of evolution is one of the most potent of the great influences for good that have thus far entered into human experience; it has promoted the progress of knowledge, it has fostered unprejudiced inquiry, and it has served as an invaluable aid in humanity's search for truth in many fields.

(4) The Council of the Association is convinced that any legislation attempting to limit the teaching of any scientific doctrine so well established and so widely accepted by specialists as is the doctrine of evolution would be a profound mistake, which could not fail to injure and retard the advancement of knowledge and of human welfare by denying the freedom of teaching and inquiry which is essential to all progress.

The American Medical Association has expressed itself similarly in a resolution, passed by its House of Delegates, on the question of the teaching of evolution, "that any restrictions of the proper study of scientific fact in regularly established scientific institutions be considered inimical to the progress of science and to the public welfare."

The American Association is being helped in preparing a defense by the Science League, which was founded last year in San Francisco in order to secure liberty of teaching in American education.

These organizations have to meet a widespread and well-organized attack. The teaching of evolution has already been prohibited by law in Oklahoma and Tennessee. Bills for the same purpose were submitted to the state legislatures in Kentucky and in Texas [1] and were rejected by the upper house, in Kentucky by a majority of one vote. In Florida the legislature passed a resolution advising the educational authorities not to employ those who teach Darwinism, and the agitation for direct prohibition is still maintained. In North and South Carolina legislative action against the teaching of evolution was defeated, but text-books and teachers who favor evolution are debarred from the state schools. Georgia has as yet no absolute legislation on the subject, but the State Education Committee last July advised the legislature to refuse grants to any school, college, or university that favored the doctrine of evolution, and it has recently withheld a grant from a state library because it contains books on evolution. Bills against the teaching of evolution are being introduced or have been introduced into the legislatures of the states of Arizona, Arkansas, Georgia, Illinois, Indiana, Iowa, Minnesota, Mississippi,[1] North Dakota, Oregon, and West Virginia.

---

[1] Since then action has been taken in Texas ordering deleted all references to Evolution in textbooks adopted for the Texas schools.—Ed.

In California the effort was made, as mentioned in *Nature*, May 9, page 683, to avert a struggle by reference of the question to a committee of the nine presidents of the state universities and leading colleges. Six of these colleges are under denominational control, and the unsatisfactory compromise previously referred to in *Nature* has not satisfied either side. A requisition is being signed for a reference of the question to a ballot at the next election; and the Fundamentalists are said to be confident that they will carry the state, unless books which give even a moderate approval of evolution are excluded from the schools.

The anti-evolution party is being supported to some extent by the publishers. Thus, one distinguished New York biologist has been requested by his publisher to omit any reference to evolution in any new editions of his text-book, owing to the objections of the southern and western states. The intellectual terrorism in some of the states may be judged by the fact that according to the *Boston Evening Transcript*, May 23, although, while the anti-evolution bill was before the legislature in Tennessee, many clergy protested against the proposed infringement of freedom of opinion, "there was never a word of protest from the State University." The northeastern states show by the comments of the press their deep regret at this outbreak of intellectual obscurantism, and it is to be hoped that an authoritative expression of opinion there may help the southern and western states to realize the heavy handicap they would be laying upon themselves, as well as upon their universities and schools, by the legal prohibition of well-established scientific principles.

---

[1] A bill prohibiting the teaching of Evolution in the tax-supported schools, has just been made law in Mississippi.—Ed.

RELIGION AND SCIENCE IN TENNESSEE[1]

The purpose of the "anti-evolution" act has been explained by John W. Butler, author of the bill, and its sponsor before the Tennessee legislature:

> I believe that the teaching of evolution as the origin of man is contrary to the teachings of God as expressed through His Word, the Bible. That is why I introduced a Bill making it illegal to teach evolution in the schools and colleges of Tennessee. There were enough other men in the Legislature, who believed as I do to pass this Bill, making it a law, and I am satisfied that their action will pass the test of any court. For some time it has been against the law of Tennessee to teach the Bible in the public schools or to allow the teaching of any system of religion, although the Bible can be read in such schools without comment. If this law can be upheld, I am satisfied that a law which, in my opinion, and those of thousands of Tennessee parents, would tend to prevent the making of infidels of our children, can be equally enforced.

So much for the author's point of view. As to his own motives and beliefs, there is no reason to impugn his statement. But it may be questioned whether a majority of the legislature were really actuated by the same motives when they gave their votes to pass the law. The *Journal of Education,* published in Nashville, Tennessee, by the George Peabody College for Teachers, tells in its issue of May, 1925, two months before the trial began, a somewhat different story:—

> The enactment was put through, by large majorities in both Houses of the Legislature, in order to satisfy a clamor that had been worked up throughout the State, particularly in certain denominations. Political expediency was perhaps a dominant factor in the mind of most of the lawmakers. There happened also to be a situation regarding a very important program for the schools of the State which made a hard fight against the evolution Bill seem not a wise policy for the school people. By majorities that were in doubt up to the last minute a Bill granting large funds to the State university and an even more important one providing, for the first time in the history of Tennessee, eight months of common-school education per year for every child in the State, also became law. The evolution Bill was crowded in ahead of them by the interests supporting it, and the friends of education swallowed it rather than lose the

---

[1] From *Round Table.* 15: 732-48. September, 1925.

slight majority they could barely command to pass the really crucial educational legislation.

A sincere man, spurred on by a powerful and unscrupulous faction of Protestant Fundamentalists, secures the passage of a bill through a legislature which has grown accustomed to pass any number of laws without concern for their consequences or their enforceability. A governor, with power to veto this legislation, approves it, thinking at the time that it will probably never be called into court. All those interests which ought to have fought the bill in its early stages—officers of state universities, progressive Christian leaders, and scientific men—sit silently by, afraid to take up a position in the matter for fear of jeopardizing their annual appropriations from the legislature, for fear of offending some of their congregation, or for fear of losing their jobs. And some of them, the "friends of education," to which the Peabody journal refers, are so certain that money is the *sine qua non,* and that "eight months of common-school education per year for every child in the state" is the royal road to enlightenment, that they regard these baubles, when compared with the anti-evolution law, as "the really crucial educational legislation." . . .

The still outstanding issues are not the personal differences between counsel, nor the non-justiciable dispute between the claims of science and religion. There are still two issues of another sort which must be fought out. The first was stated by Mr. Scopes himself, at the very end of the trial, in the only words that were permitted him throughout. "Have you anything to say" asked the judge, "why the court should not impose punishment on you?" "Your Honor," was the reply, "I will continue in the future as in the past to oppose this law in any way I can. Any other action would be in violation of my ideal of academic freedom—that is, to teach the truth as guaranteed in our Constitution of personal and religious freedom."

The hope of educated men throughout the country is that Scopes may win. But the argument on the other side is worth hearing: The tax-payers provide funds for the maintenance of the "public schools, normals and universities" of the state. They should have the right to define the objects for which these funds may or may not be spent. Some person, or body of men, must arrange the curriculum, attend to the employment and discharge of teachers, consider what subjects shall be taught, and *ipso facto,* the subjects that shall not be taught. The power and right so to regulate is in the body of tax-payers. Their representative in this, as in other matters, is the legislature. And if, by force of some obscure provision of the constitution, the court deprives the legislature of this particular regulatory power, it may, by extension, take away all regulatory power. Thus the public school system of the state would be left without organization, control, or leadership. "We do not prohibit the teaching of evolution in the privately supported schools of Tennessee," they conclude. "We do not forbid the publication or sale of books on the subject. We make no objection to sermons which uphold the theory or to newspapers which defend it. We merely say that, in those schools which spend the tax-payers' money, the legislature, representing the tax-payers, may rightly decide in what way and for what teaching money may be spent."

The reply to this fundamentalist argument is, of course, a familiar one: If you prohibit the teaching of a theory of man's development which differs from the Biblical story of creation, and if you seriously intend to carry out your purpose, you must rule out not only much of biology, but much of the related subjects as well. You must, in a word, shut the eyes of your children to the progress of science and their ears to its findings. And if you can legally smother the sciences, you can extend this power against any economic theory that may not suit your fancy, any historical facts which may not fit in with your particular view of history, any sociological theories that may not square with your conception of the nature of the state. You strike a blow at the advance of human thought. Moreover (and here is the second issue which the higher courts must pass upon) if you use the weapons of the law to exclude from your schools all knowledge and all theories, however useful, which do not coincide at every point with the literal text of the Bible, you enthrone literalism—fundamentalism—or whatever you may choose to call it—as the religion of the state. You discriminate against those fellow Christians of yours who are not afraid of "what science may do to their faith." You discriminate against Jews, Roman Catholics, Christian Scientists, Unitarians. You put the law into the hands of the literalists to use against any public school teacher who deviates a hair's-breadth from this privileged creed. You strike at the heart of the established principle of the separation of church and state.

All very true, rejoins Mr. Bryan's successor, whoever he may be. But let us look more closely at this "separation" that you speak about. An attempt was made to provide for it in the Federal Constitution—the words were not very effective, and I may win eventually on that point.[1] But for the moment we will pass that by. The various states, Tennessee included, followed the Federal example in their own constitutions, and gave an earnest of their sincerity, later on, by stipulating that the Bible should not be taught in schools supported by public funds. We agreed to a truce in the conflict between church and state, and we have carried out our share of the agreement. But see what has happened, especially in the past generation! The power of religion and the position of the church have both declined. The family as an institution has fallen from its station, conventional morality has been torn to tatters, and crime within this country has increased by leaps and bounds. We are over-run with bob-haired and bob-brained youths, from school and college, with their theories of "self-expression," running amuck in motor-cars, dance halls, gambling and bootleg parties. Your science has no morals, your evolutionary theories relieve the individual of every shred of personal responsibility, and, in addition, are an indirect attack upon the Bible, which we regard as the only source of moral authority. And do you expect us in our schools, for the support of which we pay good money, to permit you in roundabout ways to undermine the Bible, when the Bible cannot defend itself? It is not we who are now making a breach in the doctrine of the separation of church and state: it is you who have already done it.

---

[1] The First Amendment to the Federal Constitution states: "Congress shall make no law respecting an establishment of religion." But in the present case it is not Congress but the legislature of the state of Tennessee which passed the law in question.

The Fourteenth Amendment to the Federal Constitution provides that "a state may not deprive any person of life, liberty or property without due process of law." The Fourteenth Amendment has become a sort of Trojan horse, under the cover of which the Federal power has been vastly extended. The Supreme Court of the United States may decide that it applies in the Scopes case, though the application is far from clear.

The constitution of the state of Tennessee provides (in Section 3 of the Declaration of Rights) that: "No preference shall ever be given to any religious establishment or mode of worship." May the fundamentalist group be regarded as a "religious establishment"?

And again it is laid down that "No political or religious test, other than an oath to support the Constitution of the United States and of this state, shall ever be required as a qualification to any office or public trust under this state." The position of teacher is certainly not an office. Is it a "public trust"?

So the case will be heard before the highest court in Tennessee, and perhaps before the Supreme Court in Washington. The foregoing arguments will be presented, and there will be other questions no less difficult: How far, in a democracy, may a judicial body go in overriding the will of the legislature? And again: How far may the Federal power go in invading the recognized right of each state to control its own doctrine of the separation of church and state so fundamental a one in the United States that a breach in it demands a violation of the general principle of the states' rights to save it from destruction? Must the lesser principle be sacrificed to preserve the greater? Competent students of the law are as far apart as the poles on these moot points. In the recent Oregon school case, it was the trend of the Federal Supreme Court's opinion that the legislature of that state could not enforce a law which attempted to herd all children of school age out of private and into public schools. And the same court has likewise seemingly held that it is an unreasonable exercise of the power of the state legislature to forbid the teaching of German in secondary institutions even where they are maintained by public funds. The decisions are not precisely in point, so the legal outcome of the Scopes case is uncertain: but thanks to the interest which the affair has already aroused, the people of the country are sure to receive some valuable lessons in the groundwork of American constitutional law before the curtain is rung down on the Tennessee statute.

During the trial it was reported that Mr. Bryan would propose an anti-evolution amendment to the Constitution. He denied the charge, but did admit that he intended to "carry the case to the people." Seven states, he asserted, would be stormed by himself and his fellows as soon as their legislatures should convene. And soon after Scopes' conviction an injunction was sought in Washington, D.C., to stop the payment of teachers who showed "disrespect to the Holy Bible" by teaching evolution.

But Bryan's ambitious plan probably died with the Great Commoner himself, for the Georgia legislature, number one on the list of his victims, has just defeated an anti-evolution bill by a convincing majority. The Washington case, moreover, seems to have expired. It is likely that there will be a pause in the campaign outside of Tennessee until a final judgment in the Scopes case has been rendered. . .

Kentucky by the barest majority and Georgia by an overwhelming vote both rejected such legislation as Tennessee adopted. North Carolina after a bitter struggle, likewise fought its way into the clear. These examples, out of the south, are full of encouragement. And most encouraging of all is the attitude of sympathetic understanding which North Carolina holds out to her sister state.

> We ourselves were guided (says the *Raleigh News*) by the principle embodied in the Statute of Religious Freedom of Virginia. All attempts to influence the mind by temporary punishment or burthens, tend only to beget habits of hypocrisy and meanness, and are a departure from the plan of the Holy Author of our religion, who being Lord both of body and mind yet chose not to propagate it by coercion on either, as was His almighty power to do, but to exalt it by its influence on reason alone.
>
> Our fathers found the path after long struggle and strife. Tennessee, no less than North Carolina, will find the path to real truth rough and steep at times, but she no less than North Carolina will find the way.

THE MEANING OF FUNDAMENTALISM[1]

My friend, Professor Wildon Carr, has suggested to me that it might interest readers of *Nature* to learn the views of an American observer as to some of the antecedents of the singular case presently to be tried in Tennessee. The incident, dramatic as it is, is not an isolated event, but part of a movement the beginnings of which go back many years, and has already caused a serious rift in several of the more important denominations; it cannot be understood without reference to its larger setting.

The first factor to be borne in mind is geographical. The United States, in spite of its hundred and ten millions of people, is still, judged by European standards, sparsely settled, and within its ample borders includes populations separated from one another by differences of antecedents, habits, and tastes, scarcely less marked than those which separate the different countries of

---

[1] By Professor William Adams Brown, Ph.D., D.D., Roosevelt Professor of Systematic Theology, Union Theological Seminary, New York. *Nature.* 116, sup.: 70-1. July, 1925.

Europe. There are wide areas of the United States in which the inhabitants know as little of what goes on along the Atlantic seaboard as the inhabitants of China or India. To understand the psychology of fundamentalism, one must see such a play as "Sun-up," and remember that it truthfully describes the mental attitude of hundreds of thousands of American citizens of the purest English stock.

A second factor to be reckoned with is the tendency of Americans to standardize their thinking. This characteristic, which constantly surprises the English visitor, accustomed to the free expression of individual opinion on every topic under the sun, has its explanation, if not its justification, in the exceptional conditions under which the American democracy has developed its national life. With a people recruited from every quarter of the globe, living under conditions which stimulate individual initiative, there was grave danger that the unity of the national life might be lost unless the variant elements could be held in check by a powerful public opinion. In Great Britain, centuries of tradition have fixed habits of action in certain definite grooves, and one can safely allow himself the luxury of freedom in his thinking. In the United States, where tradition is at a discount, and each man does what the need of the moment seems to require, there must be some steadying and conservative influence, and this, apart from the written Constitution, is supplied by a powerful and often tyrannous public opinion. What is going on in religion in the so-called fundamentalist movement has its parallels in economics and in politics. Feeling is often substituted for reason, and the nonconformist is punished by social disapproval, if not ostracism.

To understand the theological antecendents of fundamentalism one must go back a generation to the Briggs case, the celebrated heresy trial of the last decade of the last century, which in so many ways paralleled the Robertson Smith case in Scotland. There, as here, the issue was the inerrancy of the Scripture; there, as here, the first result was the condemnation of the accused; but, at this point, the parallel ceases. In Scotland, the result was a revival of Biblical study carried into the homes of the people by a generation of ministers who were teachers as well as preachers—a revival which familiarized the rank and file of the people with the issues involved, robbed criticism of its terrors, and prepared the way for the saner and more scientific theology of today. In the United States, this result followed with certain individuals and in certain sections of the country, but for the most part the effect was different. The Briggs case shook the faith of many a minister in the old theology without giving him a firm grasp on the new. He, therefore, ceased preaching theology altogether and turned to social service or some other practical interest as a substitute. The result is that the present issue comes upon a people unprepared to meet it, and easily swept away by the plausible rhetoric of an orator like Mr. Bryan, who has learned by long practice to make words do duty for ideas.

It must be further recognized that when their real interest is separated from the fantastic opinions with which they have associated it, the Fundamentalists are contending for something with which men of a very different mental outlook may feel sympathy, namely, a positive and constructive Gospel. In the general loosening of old ties which has been the aftermath of the war not a few self-styled liberals have been ready to break completely with the past, and lightly to surrender values painfully won by the labor and sacrifices of many generations. The spectacle of this light-hearted radicalism has seriously alarmed many who would have been ready to respond to a saner presentation of the newer views, and, yielding all too readily to the psychology of the crowd, they have allowed themselves to lend their support to positions which, under less trying conditions, they would be the first to repudiate. It is not the first time in the history of religion that a good cause has been discredited by the agents of which it has made use.

One further point requires brief notice. In spite of the factors I have mentioned, the controversy would not have reached its present acute stage if there had not been on the fundamentalist side a systematic popular campaign, amply financed, which has carried the cry of the Gospel in danger into every section of the country. Only recently have the advocates of a reasonable Christianity realized the danger which confronted them, and organized for a similar campaign of education on the other side. That realization, has, however, come at last and that organization been effected, and unless the American people have been permanently bereft of the good sense which has hitherto characterized them in critical hours, we may confidently expect that the forces of reaction will be checked, and a reasonable liberty of thought be safeguarded.

THE FUNDAMENTALIST MOVEMENT[1]

The roots of fundamentalism lie in two broad facts of American religion. Scriptural literalism has been a prominent characteristic of Protestanism in this country. Its hold here has probably been stronger and certainly has been longer and marked by more extreme forms than in England and Scotland. The other main root is the modern revival of millenarianism, traceable in the United States as far back as 1878.[2] In the first decade of the present century the idea of the premillennial coming of Jesus noticeably took on strength, and the movement teaching it became a familiar religious force. The connection between this root of fundamentalism and the other is clear. Not all literalists are millenarians, but all millenarians are literalists. Therefore the millenarian revival meant fresh strength for an already widely prevalent view of the Bible. . . .

---

[1] Excerpts from "Fundamentalism in the Presbyterian Church" by Robert Hastings Nichols, of the Auburn Theological Seminary. *Journal of Religion.* 5: 14-36. January, 1925.

[2] Case, *The Millennial Hope,* p. 204; Silver, *The Lord's Return,* p. 200.

Out of scriptural literalism and the chiliastic revival, a certain school of religious thinking developed powerfully about 1910 in American Protestantism. Generally speaking, it was a rally of conservatism against liberal theology and in some degree against the advancing social interpretation of Christianity. It found influential expression in a series of pamphlets entitled *The Fundamentals,*[1] published in 1909-10. There were twelve pamphlets, containing altogether one hundred and thirty-five separate articles. The authors were British and American, of various churches, some being not at all connected with the group responsible for the series. Obviously its purpose was to enforce the essentials of Christian belief over against perversions of them due to theological liberalism, and to a less extent to the social emphasis. Naturally these essentials were interpreted in conservative fashion—largely ultra-conservative. The articles were on subjects in theology, biblical study, and religious work. Much stress was laid on the doctrine of Scripture, stated mostly in extreme literalist forms. Modern biblical criticism was attacked, and its main conclusions were refuted, in the opinion of the writers. Evolutionary thinking was controverted. Millenarianism was taught, but not made very prominent. Interest in missions and evangelism pervaded the series. *The Fundamentals* contained much teaching like that of the fundamentalist movement, but did not show much of its intolerant and divisive spirit. It was not proposed to deny to those who held other views the name of Christian, or to break up churches. A very wide free distribution of the pamphlets among American Protestants took place. They were to be found in many ministers' libraries and in the houses of many church people.

---

[1] *The Fundamentals: A Testimony to the Truth.* 12 vols. Testimony Publishing Co. Chicago.

Some well-informed men hold that *The Fundamentals* mark the beginning of fundamentalism in the Presbyterian church. Certainly these pamphlets did much to prepare the ground for fundamentalism. . . .

Before the United States entered the conflict, one effect of the World War on religious thinking was very pronounced in this country, the strengthening of the apocalyptic temper and of millenarianism. So familiar is this that it need not be described. The great flood of teaching and interest came to a climax in the astonishing Philadelphia Prophetic Conference of May, 1918, attended by five thousand or more people from all over the country. The conference adopted a "statement of belief," in eight articles, emphasizing biblical inerrancy and the deity, substitutionary atonement, bodily resurrection, and imminent return of Jesus, the last being expanded in some detail.[2] People of many churches participated in this conference. Presbyterians were prominent in it, however, and it certainly strengthened both millenarianism and literalism among Presbyterians, as it did in other churches.

It was in the post-war temper that fundamentalism as an organized general movement arose. Its genesis is familiar. People were acutely dissatisfied with Christianity as it existed. It had failed to prevent the war and other great evils. The diagnosis of the situation made by many minds was that Christianity had erred by much forsaking of ancient forms of truth. The way had been made easy for such a conclusion by the conservative theological movement already described, and by the war-time growth of millenarianism. A special preparation had been given by influential Bible conferences and institutes in the years of the war, which were increasingly under the control of men who later became leaders of fundamentalism. These meetings had devoted themselves to unfavorable study of "modernism," which meant modern biblical criticism and evolutionary thinking. Thinking of this post-war type continues to give strength to fundamentalism. Earnest Christian people, wishing to see Christianity more vital and powerful, conclude that the way to see this is to eschew all "modernism."

---

[2] *Light on Prophecy: Being the Proceedings and Addresses of the Philadelphia Prophetic Conference,* 1918. p. 12.

Here was the making of a great new religious force, which soon come to organized activity. The Philadelphia Prophetic Conference of 1918 felt the rising tide of conservatism so strongly that it decided on the holding of a greater meeting a year later.[1] This was the World Conference on Christian Fundamentals, which met in Philadelphia in May, 1919. Six thousand people assembled, from almost all the states and the Canadian provinces, and from seven foreign countries. The chief prominence in its leadership lay with Baptists, but Presbyterians were active. The conference adopted a "Doctrinal Statement" in nine articles, affirming the verbal inspiration and inerrancy of the Bible, the Trinity, the virgin birth and deity of Jesus, the fall of man and consequent depravity, the substitutionary atonement, the bodily resurrection and ascension of Jesus, his imminent return, the sonship to God of those who have faith in Jesus, and a general bodily resurrection, to blessedness or to eternal punishment.[2] What was even more important, the Conference adopted a program for action. A great expansion and more efficient organization of Bible conferences was to spread abroad the theology of the fundamentals. Support was pledged to Bible schools, while "many theological seminaries" were pronounced

---

[1] *Light on Prophecy: Being the Proceedings and Addresses of the Philadelphia Prophetic Conference,* 1918. p. 13.

[2] *God Hath Spoken*: Twenty-five Addresses Delivered at the World Conference on Christian Fundamentals. p. 8.

"unfit places for the education of our ministry." In regard to educational institutions it was urged that Christian people have to do only with institutions conforming to fundamentalism, and attack was stirred up against all others, especially colleges teaching the evolutionary idea of the origin of man. Efforts to bring religious periodicals into line were planned. It was asserted that mission boards were sending out "workers who deny the inspiration and authority of the Word of God," and threat was made of withdrawal of support from them in favor of agencies "known to be fundamentally safe." The Y.M.C.A. and Y.W.C.A. were severely criticized for tendencies to modernism. The formation of a general organization of fundamentalists activity was announced. It was broadly suggested that if Fundamentalists could not control their respective denominations, they would form "a new fellowship."[1] In its implacable hostility to any religious teaching but its own, in propagandist zeal, and in its sweeping campaign of proscription and repression, this program resembles that of the Roman Catholic Counter-Reformation; and the strength of fundamentalism is such that the comparison is not idle.

From this time the fundamentalist organization, or rather organizations, speedily established, operated on a great scale in the churches. Their activity appeared first among the Baptists, where the attempt to capture the denomination at Northern Baptist Conventions failed. Meanwhile fundamentalist agitation was going on among Presbyterians. The denominational papers before referred to were in full sympathy with the new program. The *Sunday School Times*, an undenominational paper, but edited by a Presbyterian and circulating widely among Presbyterians, was an effective instrument of fundamentalist propaganda. Mr. William Jennings Bryan, a Presbyterian elder, entered the field in March, 1922, with his book, *In His Image*: *An Answer to Dar-*

---

[1] *God Hath Spoken*: Twenty-five Addresses Delivered at the World Conference on Christian Fundamentals. p. 12-23.

winism. This, undoubtedly one of the most influential religious books of recent years, stiffly maintained scriptural literalism and threw contempt on science.

SCIENCE, BELIEF AND THE PUBLIC[1]

The old issue between science and religion, or as many preferred to call it between science and theology, has slowly but surely changed its aspect. The operation of four rather than two forces is clearly evident in the current fundamentalist controversy. Instead of an alignment of two opposing tendencies, there is now a quadrilateral situation. The "people" have been called in, so that public opinion and sentiment are a power to be reckoned with; because of this fact the state of general education is a new and decisive factor in shaping the course and outcome of the old struggle.

When a glance is cast upon the earlier conflict between the new science of nature and traditional dogmas, the mass of the people is seen to be indifferent and unconcerned; they are hardly even spectators of the combat. On one side there are a few scientific inquirers, men like Galileo, who in the course of their scientific investigations reach results, especially about astronomical matters and the place of the earth in the scheme of things, directly contrary to those contained in the official doctrines of the church. On the other hand, there are the official representatives of the church, aggrieved and insulted by the challenge of a few scientific heretics. Outside of these limited circles, few knew or cared about what was going on. But the printing press, cheap newspapers, mails and telegraph and the extension of schooling have changed all that.

Even in the few years since Darwin published his *Origin of Species* affairs have moved rapidly. The rise of protestantism and the increased active participation of laymen in matters of religious beliefs had indeed aroused a much wider public concern about the new views regarding the development of life and a naturalistic interpretation of the descent of man, than had the older scientific heresies. The issue was no longer wholly between scientific men on one side and established official authorities of the church on the other. Hot debate took place in widely circulated books and magazines, and large numbers were stirred to passionate adherence and more passionate denunciations. But I should guess that the number of daily newspapers was small that concerned themselves with the issue beyond reviews in their literary columns; it would be, I fancy, a safe wager that the controversy did not make the first page of newspapers, with glaring headlines, nor cause anything approaching the stir excited today by a single sermon by a well-known clergyman. Certain it is that bills were not introduced in legislatures and parliaments. For geology and biology not being at that time regular parts of even higher schooling, except perhaps for a few, there was nothing for statutes to regulate, unless the state was to emulate the Inquisition in regulating the diffusion of all scientific notions about the world.

---

[1] By John Dewey, Professor of Philosophy, Columbia University. *New Republic.* 38: 143-5. April 2, 1924.

These considerations help explain, it seems to me, a fact which has puzzled so many. For a long time it looked as if the conception of continuity of organic development had, in some version or other, become about as firmly entrenched in science and as accepted from science by the public mind as Copernican astronomy. Many of us imagined that a serious attack upon evolutionary views with a revival of pre-Darwinian biology was as improbable as an attack upon the astronomy of Galileo, or a wide-spread and influential campaign in behalf of the ptolemaic system. Certainly, from the specialized scientific point of view, the anti-evolutionary campaign comes about three centuries too late. If it were to affect seriously the course of scientific inquiries, a number of persons should have been strangled in their cradles some three hundred years ago. Nevertheless, the issue is for the public actual and vital today, in spite of the elapse of a generation in which we prided ourselves—just as we prided ourselves that a great war was henceforth impossible—upon the advance of the scientific spirit, and the accommodation of the public mind to the conclusions of scientific inquiries.

The moral is inevitable. The public, the popular mass that the enlightened could once refer to as canaille, has taken an active part; but the conditions which have enabled the public actively to intervene have failed in providing an education which would enable the public to discriminate, with respect to the matters upon which it is most given to vehement expression, between opinions untouched by scientific method and attitude and the weight of evidence.

This to my mind is the salient aspect of the present situation. In the large, the controversy between science and dogma in the old sense is over and done with. There are many individuals, believers and others, to whom the question of adjusting their religious conceptions to the conclusions of science is still a vital one. But as a technical and professional cause, science has won its freedom. Scientists in the field and the laboratory may be discommoded at times, individual inquirers and teachers may lose their jobs. But the scientific revolution is nevertheless accomplished; and it is one of the revolutions that do not turn backwards. Inquirers will go on inquiring, and the results of their inquiries will be disseminated at least among their fellow-workers, and will make their way—even if they are as revolutionary as are the discoveries of the last thirty years regarding the constitution of matter and energy, ideas more upsetting of older conceptions in many ways than were those of the intellectual pioneers of the seventeenth century. The real issue is not here. It concerns the growing influence of the general public in matters of thought and belief, and the comparative failure of schooling up to the present time to instil even the rudiments of the scientific attitude in vast numbers of persons, so as to enable them to distinguish between matters of mere opinion and argument and those of fact and ascertainment of fact.

Americans who have been abroad tell of the amused incredulity of educated Europeans over reports of the state of scientific and theological controversy in this country; the reports seem incredible except upon the basis of an almost barbaric state of culture. Yet it may be doubted whether if numbers alone were taken into account, there would not be a larger proportion of persons in this country who could give an intelligent statement of the scientific conceptions involved than in most European countries. The difference is that in those countries those who could not give an intelligent exposition hardly count at all. Here, owing to the spread of democracy in social relations and in education, they count for a great deal. They feel themselves concerned and have channels through which they can make their influence felt.

Naturally such a situation is sport for those hostile to democracy and to universal schooling. They are entitled to chuckle and to make the most of it in their indictments. But, after all, it is a condition and not a theory that confronts us. Defences of democracy are about as much out of place in any scheme of action as are attacks. No social creed produced the present situation. The consequences of the industrialization of affairs in such things as change of population from rural to urban, quick and easy transportation of persons and goods, cheap communications and the rise of cheap printing-matter, have created that state of society which we call democratic, and the democratic creed. Unless the movement of forces is radically altered, attacks upon democracy are about as effective as shooting paper-wads at a battle-ship—an occupation that may also conceivably relieve the feelings under certain conditions.

The realities of the situation center about what can be done to ally the forces which create the democratizing of society with the mental and moral attitudes of science. The worst of the predicament is a tendency toward a vicious circle. The forces that compel some degree of general schooling also make for a loose, scrappy and talkative education, and this education in turn reenforces the bad features of the underlying forces. But it is some gain to know where the issue actually lies; to be compelled to face the fact that while schooling has been extended and scientific subjects have found their way into the regular course of studies, little has been accomplished as yet in converting prejudiced and emotional habits of mind into scientific interest and capacity.

This generic diagnosis of the disease may be specified in two particulars. There is a considerable class of influential persons, enlightened and liberal in technical, scientific and religious matters, who are only too ready to make use of appeal to authority, prejudice, emotion and ignorance to serve their purposes in political and economic affairs. Having done whatever they can do to debauch the habit of the public mind in these respects, they then sit back in amazed sorrow when this same habit of mind displays itself violently with regard, say, to the use of established methods of historic and literary interpretations of the scriptures or with regard to the animal origin of man. "Fundamentalism" might have been revived even if the great war had not occurred. But it is reasonable to suppose that it would have not assumed such an intolerant and vituperative form, if so many educated men, in positions of leadership, had not deliberately cultivated resort to bitter intolerance and to coercive suppression of disliked opinions during the war.

Again, a man may be thoroughly convinced that the spread of certain economic ideas is dangerous to society; but if he encourages, even by passivity, recourse to coercion and intimidation in order to resist the holding and teaching of these ideas, he should not be surprised if others fail to draw the line of persecution and intolerance just where he personally would draw it. The statement that as we sow, so shall we reap, is trite. But there is no field of life in which it applies so aptly and fully as in that of belief and the methods employed to affect belief. Until highly respectable and cultivated classes of men cease to suppose that in economic and political matters the importance of the end of social stability and security justifies the use of means other than those of reason, the intellectual habit of the public will continue to be corrupted at the root, and by those from whom enlightenment should be expected.

The other point concerns the kind of education given in the schools, as that is affected by the temper of actual and professed pillars of society. There are at the best plenty of obstacles in the way of thinking in general, and in particular of using school instruction so as to further discriminating and circumspect thought. The weight of authority, custom, imitation, pressure of time, large numbers, the need of "covering the ground," of securing mechanical skill, of uniformity in administrative matters, of sparing tax-payers, all conspire to depress thinking. These extraneous obstacles are consolidated and held together by the fear entertained by many "best minds" lest the schools promote habits of independent thinking. Fundamentally, fear of the consequences of thought underlies most professions of reverence for culture, respect for quantity of information and emphasis upon discipline. The fundamental defect in the present state of democracy is the assumption that political and economic freedom can be achieved without first freeing the mind. Freedom of mind is not something that spontaneously happens. It is not achieved by the mere absence of obvious restraints. It is a product of constant, unremitting nurture of right habits of observation and reflection. Until the taboos that hedge social topics from contact with thought are removed, scientific method and results in subjects far removed from social themes will make little impression upon the public mind. Prejudice, fervor of emotion, bunkum, opinion and irrelevant argument will weigh as heavily as fact and knowledge. Intellectual confusion will continue to encourage the men who are intolerant and who fake their beliefs in the interests of their feelings and fancies.

OPPOSED TO THE TEACHING OF EVOLUTION

DARWIN ON TRIAL: THE CASE AGAINST EVOLUTION[1]

In spite of the recent legal squabble at Dayton, Tennessee, most people in England seem to be quite unaware of the widespread revolt against the doctrine of organic evolution now in progress in the United States. And although it may not be flattering to England to say so, this revolt "has begun in America simply because the United States is a more advanced country than England," to quote the words of Joseph McCabe in *The Literary Guide,* August, 1925. Hence it may not be amiss for us to go over briefly some of the reasons for this condition of affairs. . . .

Two facts regarding the prevalence of education in the United States are essential as a background, in studying this problem. First, advanced education is far more widespread in America than here in England. By this I do not mean for a moment that the average college-trained American is in any way superior to the educated Englishman; but it cannot be denied that, out of a million people from each of these countries, a much larger number of the Americans would be found to have had high-school or university training. If we add to this the further fact that such sciences as botany, zoology, and general biology are very much more commonly taught in the high schools and colleges and universities of America, we will have the background essential to a proper understanding of the other aspects of the question we are here to consider. Hence it might be very naturally inferred that it is not because the Americans are a very backward people educationally, but because they are an advanced and progressive people, that we are witnessing the spectacle of many thousands of people of all classes rising in a militant attitude of resistance to this theory of organic evolution. I am here not in the least concerned with the right or the wrong of passing laws or enforcing them saying what subjects shall or shall not be taught in the tax-supported schools of the various states of the American union; I am here looking at the matter solely as a spectator, and am merely trying to narrate the facts in the case.

---

[1] By George McCready Price, M.A., author of numerous scientific works, and formerly Professor of Geology in Union College, Nebraska. *Review of Reviews* (London). p. 235-9. September, 1925.

But what are the scientific reasons which are leading many well-educated people to discard this theory which has so long been accepted, and which is still very widely accepted among people of good education? For, in spite of some very positive statements to the contrary which one sees in the newspapers and magazines, there are literally thousands of people in the United States with full college (or university) education, and an education which in many instances has included much work in the natural sciences, who are very positive in repudiating the theory of organic evolution, as in any way an adequate explanation of the origin of the plants and animals of our globe. The late William Jennings Bryan should not be regarded for a moment as a fair representative of the class to which I refer. Mr. Bryan had a literary and legal training which he received very early in life; but, although he had a keen mind in certain respects, he was singularly immune to any inoculation from the ambient scientific spirit; and to the last he refused to study even those scientific arguments which were available on his own side of the question. But there are thousands of people who have had good training in several of the biological sciences (to say nothing of the physical sciences), but who are nevertheless discarding the theory here referred to. Thus the question naturally arises, Why are they taking this attitude?

Their reasons may be grouped under two heads, the biological and the geological; thus corresponding to the two general divisions under which the arguments *for* evolution have been advocated.

If we look at the history of this doctrine (and the doctrine cannot be understood apart from its history), we see that it grew up on two main foundations: First, the geological uniformitarianism of Charles Lyell, which, of course, already included the *serial arrangement of the fossils* in a very definite order supposed to be truly historical; and second, the *method* of actually changing or transforming species, as suggested by Darwin and Lamarck. And so long as these two foundation ideas were regarded as reliable and scientifically established, organic evolution was rightly regarded as a reasonable explanation of the origin of the organisms which have peopled the earth. But naturally enough we may ask ourselves, what would naturally happen if *both* of these foundation ideas are discredited as unscientific?

The three chief methods of trying to explain the "origin of species," or the means by which one type of animal or plant might become completely changed over in the course of many generations into a different type, are those suggested respectively by Lamarck, Darwin, and De Vries. Each of these theories had its heyday of popularity; each has still a few ardent propagandists; but all have alike been practically discarded by the great majority of biological students. Many modern men of science take the attitude that possibly all three of these explanations have some merit in them; forgetting, as it seems to me, that these three explanations are almost mutually exclusive, and are quite inconsistent with one another, and that our modern knowledge of experimental breeding, based on Mendelism, tends to discredit each and all of these once-popular explanations. True, there are others who are still hoping that some other method of transforming species will turn up under further study; but to my mind the best type of modern biological thought is represented by the declaration of Bateson, in his Toronto address, about four years ago. In this address he said:

> We cannot see how the differentiation into species came about. Variation of many kinds, often considerable, we daily witness, but no origin of species. . . . Meanwhile, though our faith in evolution stands unshaken, we have no acceptable account of the origin of "species."—*Science. January* 20, 1922.

. . . This belief in evolution *somehow,* as an act of faith, might be understood, if the geological background were still intact and of assured scientific value. But what is the real situation with regard to the geological evidence for evolution?

Clearly enough, if an impartial geology, that is, one not vitiated with evolutionary assumptions, can prove that the earth has been peopled with a series of gradually advancing types of life, and can assure us of the *definite order* in which these various types appeared, this fact alone would almost win the case for some sort of organic development. For I think it almost instinctive in the human mind to prefer some connection of natural development between the members of such a series (if they were actually successive in time), rather than to posit a long series of successive creations, as Cuvier and his followers did; creation we know, and evolution we know; but what is this *tertium quid,* a mental hybrid as useless and impotent as other hybrids?

On the other hand, if on investigation this geological witness turns out to be quite untrustworthy, or is even convicted of collusion with the defendant, we shall not be able to work up much enthusiasm for any scheme of evolution merely from the acknowledged resemblances of comparative anatomy and from the curiosities of embryology, without this background of the geological series arranged in a definite and reliable order which has all the features of a real world-history. . . .

If we look at this subject of the fossils in a broad way, without any theoretical prejudices, we must own that the geological series, from the Cambrian and Ordovician up to the Tertiary and the Pleistocene, is a purely artificial arrangement, made for the purpose of more easily handling the vast mass of facts regarding the rocks. But the Cambrian rocks are not always found (in the field) at the bottom of the series; and they do not always look old; there are many places where they are soft and unconsolidated, and look as young as any recent sand or clay or gravel. Conversely, the very "young" Tertiary and Pleistocene often look extremely ancient, being hard and even metamorphosed and crystalline, and looking as old as any rocks on earth.

Furthermore, it might well be supposed that in following out this arbitrary rule about certain fossils being "old" and others being "young," serious difficulties would be encountered in the field. Chief among these difficulties are those cases which geologists call "deceptive conformities" and "thrust faults." Let me define these terms.

When we find two layers or beds of rock lying the one upon the other in such a condition that the lower one shows no sign of having been disturbed in any way, either by having been tilted up or eroded, before the upper layer was deposited upon it, the two beds are said to be "conformable," or there is "conformity" of bedding. Obviously in such a case no great length of time has elapsed between the deposition of these two layers. But it often happens that a bed called very "young," because of its contained fossils, is found in what looks like perfect conformity upon another bed with fossils which are classed as very, very much older. In such an instance, there is nothing in the way of erosion or disturbance to mark the "hiatus" or the "lost interval," though according to the geological scheme many millions of years must have elapsed between the deposition of the two beds. The physical evidence all tends to indicate that they must have followed one another in natural and uninterrupted succession, even in quick succession. To make the matter still worse, often the two incongruous beds look exactly alike, the same kind of limestone, the same kind of shale, or the same kind of sandstone; they look like one formation, not two; and no geologists would think of making two formations out of them except for their fossils. Such phenomena are termed "deceptive conformities"; and they are numbered not in hundreds, but in thousands, and are scattered all over the globe. Often one of these "deceptive conformities" may cover an area of several hundred square miles, and occasionally thousands of square miles.

"Thrust faults" (often called simply "thrusts") are of similar physical character, but *inversely;* that is, the rocks are not physically inverted, but the order of the "index fossils" is the inverse of the "standard" order of sequence. Here again the beds often look much alike, and may even be composed of much the same lithic materials; though more commonly the two formations are distinct enough, but every scrap of physical evidence connected with them goes to show that the beds were actually laid down in the order in which we now find them. But the evolutionary geologist says: "No; for the *fossils show* that the upper beds are much 'older' than the ones underneath; hence we must suppose that these upper beds were once down deep underneath, but that they have been lifted up and pushed bodily over on top of these much 'younger' beds."

Examples of this sort are also found in many parts of the world. One famous instance of this sort is in the Alps, and comprises much of the middle of Switzerland; one is in Scandinavia; one in the Grampians; one five hundred miles long in North China; and one in the Salt

Range in India, where Cambrian beds occur on top of Tertiary.

A large number of such anti-evolution phenomena occur in North America. One that has become famous is in the south-western part of Alberta and the north-western part of the state of Montana, where the front range of the Rocky Mountains, in one place several parallel ranges, lie in what looks exactly like ordinary conformity on the Cretaceous of the plains, the mountains themselves being classed as Algonkian (or pre-Cambrian) in the Montana part, and as Cambrian and Devono-Carboniferous in the more northern parts. For the whole region is some four hundred and fifty miles long, running to Mount Robson in the north, and comprising all of the Glacier National Park in the south, or in the Montana part.

I have not the time to describe these areas in detail. The actual facts in these cases have been given us by government officials, who express their amazement at the remarkable way in which these rocks resemble an ordinary stratigraphical sequence, in spite of the evidence of the fossils to the contrary. But so completely is the science of geology dominated by this evolutionary theory (or prejudice), that one is called a "heretic" and almost cast out of the scientific synagogue if he dares to intimate that the physical evidence in such cases should be taken at its face value, no matter what may become of the theory.

Such, then, is the brief outline of the case against organic evolution. Of course, sooner or later, these facts are bound to receive an airing in public. At present, however, the thing that is in most evidence seems to be a concerted conspiracy of silence regarding these matters, at least in certain quarters. In the meantime, however, the "Fundamentalists" are making a great deal of these newly-discovered facts.

EVOLUTION SHOULD NOT BE TAUGHT[1]

This is not an interference with freedom of conscience. A teacher can think as he pleases and worship God as he likes, or refuse to worship God at all. He can believe in the Bible or discard it; he can accept Christ or reject Him. This law places no obligations or restraints upon him.

And so with freedom of speech. He can, so long as he acts as an individual, say anything he likes on any subject.

This law does not violate any rights guaranteed by any constitution to any individual. It deals with the defendant, paid by the state and, therefore, under instructions from the state.

The right of the state to control the public schools is affirmed in the recent decision in the Oregon case, which declares that the state can direct what shall be taught and also forbid the teaching of anything "manifestly inimical to the public welfare." The above decision goes even farther and declares that the parent not only has the right to guard the religious welfare of the child, but is in duty bound to guard it. That decision fits this case exactly. The state had a right to pass this law, and the law represents the determination of the parents to guard the religious welfare of their children.

It need hardly be added that this law did not have its origin in bigotry. It is not trying to force any form of religion on anybody. The majority is not trying to establish a religion or to teach it—it is trying to protect itself from the effort of an insolent minority to force irreligion upon the children under the guise of teaching science.

What right has a little irresponsible oligarchy of self-styled "intellectuals" to demand control of the schools of the United States, in which twenty-five million of children are being educated at an annual expense of nearly $2,000,000,000?

---

[1] Excerpts from text of argument prepared by William J. Bryan for the Scopes trial, published posthumously in the *New York World* for July 29, 1925.

Christians must, in every state in the union, build their own colleges in which to teach Christianity; it is only simple justice that atheists, agnostics and unbelievers should build their own colleges if they want to teach their own religious views or attack the religious views of others.

. . . The facts and arguments presented to you must not only convince you of the justice of conviction in this case, but, while not necessary to a verdict of guilty, they should convince you of the righteousness of the purpose of the people of the state in the enactment of this law. The state must speak through you to the outside world and repel the aspersions cast by the counsel for the defense upon the intelligence and the enlightenment of the citizens of Tennessee.

The people of this state have a high appreciation of the value of education. The state constitution testifies to that in its demand that education shall be fostered and that science and literature shall be cherished. The continuing and increasing appropriations for public instruction furnish abundant proof that Tennessee places a just estimate upon the learning that is secured in its schools.

Religion is not hostile to learning; Christianity has been the greatest patron learning has ever had. But Christians know that "the fear of the Lord is the beginning of wisdom," now just as it has been in the past and they, therefore, oppose the teaching of guesses that encourage godlessness among the students.

THE SERVICES OF SCIENCE

Neither does Tennessee undervalue the service rendered by science. The Christian men and women of Tennessee know how deeply mankind is indebted to science for benefits conferred by the discovery of the laws of nature and by the designing of machinery for the utilization of these laws. Give science a fact and it is not only invincible, but it is of incalculable service to man. If one is entitled to draw from society in proportion to the service that he renders to society, who is able to estimate the reward earned by those who have given to us the use of steam, the use of electricity, and enabled us to utilize the weight of water that flows from the mountain side; who will estimate the value of the service rendered by those who invented the phonograph, the telephone and the radio? Or, to come more closely to our home life, how shall we recompense those who gave us the sewing machine, the harvester, the threshing machine, the tractor, the automobile and the method now employed in making artifical ice?

The department of medicine also opens an unlimited field for invaluable service. Typhoid and yellow fever are not feared as they once were. Diphtheria and pneumonia have been robbed of some of their terrors, and a high place on the scroll of fame still awaits the discoverer of remedies for arthritis, cancer, tuberculosis and other dread diseases to which mankind is heir.

Christianity welcomes truth from whatever source it comes, and is not afraid that any real truth from any source can interfere with the divine truth that comes by inspiration from God Himself. . . .

Our first indictment against evolution is that it disputes the truth of the Bible account of man's creation and shakes faith in the Bible as the Word of God.

This indictment we prove by comparing the processes described as evolutionary with the text of Genesis. It not only contradicts the Mosaic record as to the beginning of human life, but it disputes the Bible doctrine of reproduction according to kind—the greatest scientific principle known.

Our second indictment is that the evolutionary hy-

pothesis, carried to its logical conclusion, disputes every vital truth of the Bible. Its tendency, natural, if not inevitable, is to lead those who really accept it, first to agnosticism and then to atheism. Evolutionists attack the truth of the Bible not openly at first but by using weasel-like words like "poetical," "symbolical" and "allegorical" to suck the meaning out of the inspired record of man's creation. . . .

When Darwin entered upon his scientific career he was "queer orthodox" and "quoted the Bible as an unanswerable authority on some point of morality." Even when he wrote *Origin of Species,* the thought of "a first cause, having an intelligent mind in some degree analagous to man" was strong in his mind. It was after that time that "very gradually, with many fluctuations," his belief in God became weaker.

He traces this decline for us and concludes by telling us that he cannot pretend to throw the least light on such abstruse problems—the religious problems above referred to. Then comes the flat statement that he "must be content to remain an agnostic;" and to make clear what he means by the word agnostic, he says that "the mystery of the beginning of all things is insoluble by us"—not by him alone, but by everybody.

Here we have the effect of evolution upon its most distinguished exponent; it led him from an orthodox Christian believing every word of the Bible and in a personal God, down and down and down to helpless and hopeless agnosticism. . . .

How can any teacher tell his students that evolution does not tend to destroy his religious faith? How can an honest teacher conceal from his students the effect of evolution upon Darwin himself?

And is it not stranger still that preachers who advocate evolution never speak of Darwin's loss of faith, due to his belief in evolution?

The parents of Tennessee have reason enough to fear the effect of evolution on the minds of their children.

Belief in evolution cannot bring to those who hold such a belief any compensation for the loss of faith in God, trust in the Bible and belief in the supernatural character of Christ. It is belief in evolution that has caused so many scientists and so many Christians to reject the miracles of the Bible and then give up, one after another, every vital truth of Christianity. They finally cease to pray and sunder the tie that binds them to their Heavenly Father. . . .

UNDERMINING RELIGION

And it must be remembered that we can measure the effect on only that part of life which is spent on earth; we have no way of calculating the effect on that infinite circle of life of which existence here is but a small arc. The soul is immortal and religion deals with the soul; the logical effect of the evolutionary hypothesis is to undermine religion and thus affect the soul.

I recently received a list of questions that were to be discussed in a prominent eastern school for women. The second question in the list read:

> Is religion an obsolescent function that should be allowed to atrophy quietly, without arousing the passionate prejudice of outworn superstition?

The real attack of evolution, it will be seen, is not upon Orthodox Christianity, or even upon Christianity, but upon religion—the most basic fact in man's existence and the most practical thing in life.

But I have some more evidence of the effect of evolution upon the life of those who accept it and try to harmonize their thought with it.

UNBELIEF AMONG SCIENTISTS

James H. Leuba, a professor of psychology at Bryn Mawr College, Pennsylvania, published a few years ago a book entitled *Belief in God and Immortality.* In this book he relates how he secured the opinions of scientists as to the existence of a personal God and a personal immortality. He used a volume entitled *American Men of Science,* which, he says, included the names of "practically every American who may properly be called a scientist." There were fifty-five hundred names in the book. He selected one thousand as representative of the fifty-five hundred and addressed them personally. Most of them, he said, were teachers in schools of higher learning. The names were kept confidential. Upon the answers received, he asserts that over half of them doubt or deny the existence of a personal God and a personal immortality, and he asserts that unbelief increases in proportion to prominence, the percentage of unbelief being greatest among the most prominent. Among biologists, believers in a personal God numbered less than 31 per cent, while believers in a personal immortality numbered only 37 per cent.

He also questioned the students in nine colleges of high rank and from one thousand answers received, 97 per cent of which were from students between eighteen and twenty, he found that unbelief increased from 15 per cent in the freshman class up to 40 to 45 per cent among the men who graduated. On page 280 of this book, we read: "The students' statistics show that young people enter college possessed of the beliefs still accepted, more or less perfunctorily, in the average home of the land, and gradually abandon the cardinal Christian beliefs." This change from belief to unbelief he attributes to the influence of the person "of high culture under whom they studied."

The people of Tennessee have been patient enough; they acted none too soon. How can they expect to protect society, and even the church, from the descending influence of agnosticism and atheism if they permit the teachers employed by taxation to poison the minds of the youth with this destructive doctrine? . . .

Do bad doctrines corrupt the morals of students? We have a case in point. Mr. Darrow, one of the most distinguished criminal lawyers in our land, was engaged about a year ago in defending two rich men's sons who were on trial for as dastardly a murder as was ever committed. The older one, "Babe" Leopold, was a brilliant student, nineteen years old. He was an evolutionist and an atheist. He was also a follower of Nietzsche, whose books he had devoured and whose philosophy he had adopted. Mr. Darrow made a plea for him, based upon the influence that Nietzsche's philosophy had exerted upon the boy's mind. . . .

Psychologists who build upon the evolutionary hypothesis teach that man is nothing but a bundle of characteristics inherited from brute ancestors. This is the philosophy which Mr. Darrow applied in this celebrated criminal case. "Some remote ancestor—he does not know how remote—sent down the seed that corrupted him." You cannot punish the ancestor—he is not only dead, but, according to the evolutionists, he was a brute and may have lived a million years ago. And he says that all the biologists agree with him—no wonder so small a per cent of the biologists, according to Leuba, believe in a personal God.

This is the quintessence of evolution distilled for us by one who follows that doctrine to its logical conclusion. Analyze this dogma of darkness and death. Evolutionists say that back in the twilight of life a beast, name and nature unknown, planted a murderous seed and that the impulse that originated in that seed throbs forever in the blood of the brute's descendant, inspiring killings innumerable, for which the murderers are not responsible because coerced by a fate fixed by the laws of heredity. It is an insult to reason and shocks the heart. The doctrine is as deadly as leprosy; it may aid a lawyer in criminal cases, but it would, if generally adopted, destroy all sense of responsibility and menace the morals of the world.

A brute, they say, can predestine a man to crime, and yet they deny that God incarnate in the flesh can release a human being from this bondage or save him from ancestral sins. No more repulsive doctrine was ever proclaimed by man. If all the biologists of the world teach this doctrine—as Mr. Darrow says they do—then may Heaven defend the youth of our land from their impious babblings.

Our third indictment against evolution is that it diverts attention from pressing problems of great importance to trifling speculation. While one evolutionist is trying to imagine what happened in the past, another is trying to pry open the door of the distant future. One recently grew eloquent over ancient worms, and another predicted that seventy-five thousand years hence every one will be bald and toothless. Both those who endeavor to clothe our remote ancestors with hair and those who endeavor to remove the hair from the heads of our remote descendants ignore the present with its imperative demands.

The science of "How to Live" is the most important of all the sciences. It is desirable to know the physical sciences, but it is necessary to know how to live.

Christians desire that their children shall be taught all the sciences, but they do not want them to lose sight of the Rock of Ages while they study the age of rocks; neither do they desire them to become so absorbed in measuring the distance between the stars that they will forget Him who holds the stars in His hand.

While not more than 2 per cent of our population are college graduates, these, because of enlarged powers, need a "heavenly vision" even more than those less learned, both for their own restraint and to assure society that their enlarged powers will be used for the benefit of society and not against the public welfare. Evolution is deadening the spiritual life of a multitude of students.

Christians do not desire less education, but they desire that religion shall be entwined with learning, so that our boys and girls will return from college with their hearts aflame with love of God and love of fellow men and be prepared to lead in the altruistic work that the world so sorely needs. The cry in the business world, in the industrial world, in the professional world, in the political world, even in the religious world, is for consecrated talents, for ability plus a passion for service.

Chills Enthusiasm for Reform

Our fourth indictment against the evolutionary hypothesis is that, by paralyzing the hope of reform, it discourages those who labor for the improvement of man's condition. Every upward-looking man or woman seeks to lift the level upon which mankind stands, and they trust that they will see beneficent changes during the brief span of their own lives. Evolution chills their enthusiasm by substituting aeons for years. It obscures all beginnings in the mists of the endless ages. It is represented as a cold and heartless process, beginning with time and ending in eternity, and acting so slowly that even the rocks cannot preserve a record of the imaginary changes through which it is credited with having carried an original germ of life that appeared some time from somewhere.

Its only program for man is scientific breeding, a system under which a few supposedly superior intellects, self-appointed, would direct the mating and the movements of the mass of mankind—an impossible system! Evolution, disputing the miracle and ignoring the spiritual in life, has no place for the regeneration of the individual. It recognizes no cry of repentance and scoffs at the doctrine that one can be born again. . . .

Our fifth indictment of the evolutionary hypothesis is that if taken seriously and made the basis of the philosophy of life, it would eliminate love and carry man back to a struggle of tooth and claw. The Christians who have allowed themselves to be deceived into believing that evolution is a beneficent, or even a rational process, have been associated with those who either do not understand its implications or do not avow or dare not avow them.

Let me give you some authority on this subject. I will begin with Darwin, the high priest of evolution, to whom all evolutionists bow.

On pages 149 and 150, in *The Descent of Man,* already referred to, he says:

> With savages the weak in body or mind are soon eliminated. And those that survive commonly exhibit a vigorous state of health. We civilized men, on the other hand, do our utmost to check the process of elimination; we build asylums for the imbecile, the maimed and the sick; we institute poor laws and our medical men exert their utmost skill to save the life of every one to the last moment. There is reason to believe that vaccination has preserved thousands who from a weak constitution would formerly have succumbed to smallpox.
>
> Thus the weak members of civilized society propagate their kind. No one who has attended to the breeding of domestic animals will doubt that this must be highly injurious to the race of man. But, excepting in the case of man himself, hardly any one is so ignorant as to allow his worst animals to breed.
>
> The aid which we feel impelled to give to the helpless is mainly an incidental result of the instinct of sympathy, which was originally acquired as part of the social instincts, but was subsequently rendered, in the manner previously indicated, more tender and more widely diffused. How could we check our sympathy, even at the urging of hard reason, without deterioration in the noblest part of our nature . . . We must therefore bear the undoubtedly bad effects of the weak surviving and propagating their kind. . . .

Could any doctrine be more destructive of civilization? And what a commentary on evolution! He wants us to believe that evolution develops a human sympathy that finally becomes so tender that it repudiates the law that created it and thus invites a return to a level where the extinguishing of pity and sympathy will permit the brutal instincts to again do their progressive work.

"MORE BRUTAL THAN DARWIN"

Let no one think that this acceptance of barbarism as the basic principle of evolution died with Darwin. Within three years a book has appeared whose author is even more frankly brutal than Darwin. The book is entitled *The New Decalogue of Science.* . . .

I read you the following (see page 34):

> Evolution is a bloody business, but civilization tries to make it a pink tea. Barbarism is the only process by which man has ever organically progressed, and civilization is the only process by which he has ever organically declined. Civilization is the most dangerous enterprise upon which man ever set out. For when you take man out of the bloody, brutal but beneficient hand of natural selection you place him at once in the soft, perfumed, daintily gloved but far more dangerous hand of artificial selection. And unless you call science to your aid and make this artificial selection as efficient as the rude methods of nature, you bungle the whole task.

This aspect of evolution may amaze some of the ministers who have not been admitted to the inner circle of the iconoclasts whose theories menace all the ideals of civilized society. Do these ministers know that "evolution is a bloody business?" Do they know that "barbarism is the only process by which man has ever organically progressed" and that "civilization is the only process by which man has ever organically declined?" Do they know that "the bloody, brutal hand of natural selection" is "beneficent" and that the artificial selection "found in civilization is dangerous?" What shall we think of the distinguished educators and scientists who read the manuscript before publication and did not protest against this pagan doctrine? . . .

Kidd says that Nietzsche gave Germany the doctrine of Darwin's efficient animal in the voice of his superman, and that Bernhardi and the military text books in due time gave Germany the doctrine of the superman translated into the national policy of the super-state aiming at world power.

And what else but the spirit of evolution can account for the popularity of the selfish doctrine, "each one for himself, and the devil take the hindmost," that threatens the very existence of the doctrine of brotherhood.

In 1900, twenty-five years ago, while an international peace congress was in session at Paris, the following editorial appeared in *L'Univers*:

> The spirit of peace has fled the earth because evolution has taken possession of it. The plea for peace in past years has been inspired by faith in the divine nature and the divine origin of man; men were then looked upon as children of one father, and war, therefore, was fratricide. But now that men are looked upon as children of apes, what matters it whether they are slaughtered or not? . . .

Science needs religion to direct its energies and to inspire with lofty purpose those who employ the forces that are unloosed by science. Evolution is at war with religion because religion is supernatural; it is, therefore, the relentless foe of Christianity, which is a revealed religion.

Let us, then, hear the conclusion of the whole matter. Science is a magnificent material force, but it is not a teacher of morals. It can perfect machinery, but it adds no moral restraints to protect society from the misuse of the machine. It can also build gigantic intellectual ships, but it constructs no moral rudders for the control of storm-tossed human vessels.

It not only fails to supply the spiritual element needed, but some of its unproven hypotheses rob the ship of its compass and thus endanger its cargo.

AN EVIL GENIUS IN WAR

In war, science has proven itself an evil genius. It has made war more terrible than ever before. Man used to be content to slaughter his fellow men on a single plane—the earth's surface. Science has taught him to go down into the water and shoot up from below, and to go up into the clouds and shoot down from above, thus making the battlefield three times as bloody as it was before; but science does not teach brotherly love.

Science has made war so hellish that civilization was about to commit suicide; and now we are told that newly discovered instruments of destruction will make the cruelties of the late war seem trivial in comparison with the cruelties of war that may come in the future.

If civilization is to be saved from the wreckage threatened by intelligence not consecrated by love, it must be saved by the moral code of the meek and lowly Nazarene. His teachings, and His teachings alone, can solve the problems that vex the heart and perplex the world.

The world needs a savior more than it ever did, and there is only one name heaven-given among men whereby we must be saved. It is this name that evolution degrades, for, carried to its logical conclusion, it robs Christ of the glory of a virgin birth, of the majesty of His deity and mission, and of the triumph of His resurrection.

EVOLUTION TODAY—ITS MEANING AND TENDENCY[1]

A careful examination of the textbooks on biology, psychology, geology, and history discloses the fact that many of the prominent scientists in the United States have discarded belief in a personal God and personal immorality. They have substituted, instead, an impersonal "energy" called monism. What is the underlying thought of this new school? It is this—man is not a sinner, a fallen being, but a creature of exalted rank, capable, by an evolutionary process of becoming immune from sin, of working out his own destiny without Bible, atonement, or Saviour. Instead of the historic interpretation of man created in the image of God, endowed with God-breathed soul, having immortality essentially bound up within him, man is regarded just as an improved beast. Instead of sin being rebellion against the Creator, and having an inherent evil tendency, deserving of the wrath of God, sin is regarded as a mere trifling thing, the evidence of an awakening, a step upward. Instead of the Bible being a revelation from God, infallibly given, it is taught that the Bible is no revelation at all. Instead of truth being ascertainable and approachable, it is taught that it lies just beyond us. It can never be reached. It is not possessed absolutely, nor can it be so possessed. From this viewpoint there is, therefore, no certainty; all is conjecture; there is no anchor of the soul entering into that within the veil. . . .

---

[1] By J. Wesley Miller. *Reformed Church Review.* 11: 291-308. July, 1923.

Is not the doctrine of "the survival of the fittest" making the industrial situation of the world such a menace as it never was before? Has there ever been, since the birth of Christ, so much class consciousness in the members of the two groups known as the capitalist group and the labor group? Have there ever been so many who look forward with a vague dread to what they regard as an inevitable conflict?

What can save the world from the gross materialism that tends to make each man regard his brother from the brute standpoint, instead of the viewpoint of a brother? A return to a belief in a personal God. How did Christ describe the need of His day and ours? He proclaimed as the first great Commandment: "Thou shalt love the Lord thy God with all thy heart, and with all thy soul, and with all thy mind." Philosophy sought to preserve the moral character by improving the ethics, Christianity reversed the order and by that revolutionized human thought.

For what certain, definite tenets does the church stand? God, the Supreme Being, Creator of the universe, the inspiration of Scripture, sin as a poison in the soul, an estrangement from God, moral pollution, Jesus Christ as an historical personage, the efficacy of the blood of Christ to save man through faith, eternal life. Is there not a great gulf between modernism and the teaching of the church? Does not the new energetic monism tend to undermine the whole Christian system?

What is the trend of thought in the large universities of the land? A careful study reveals the fact that the trend to a large extent, is either fundamentally indifferent to Christianity or is out of relation with it. There is a theory that social ethics will save society. Japan had a code of ethics twenty-five hundred years before Christ was born, but not until missionaries of the Cross carried the Gospel message—that man is of more value than sheep—was the social condition in Japan materially improved. To what is modern indifference to Christianity due? Partly to the materialism of the age, the love of pleasure, and superficial thought. But the real cause, however, is of a scholastic and intellectual character. This intellectual temper is often onesided or ignorantly critical. Can a stream be materially different from the fountain head? Every phase of modern life is affected by the trend of thought in the centers of influence. Is it not true that what the universities teach in one generation is proclaimed broadcast the next? The new views are disseminated with ease by the scientific, popular, and semi-popular magazines.

Is it not possible so to present the underlying principles of physics and psychology that people of average intelligence may understand that true science is not necessarily destructive of Christianity?

EVOLUTION AND EDUCATION[1]

Professor Metcalf of Oberlin College, who was permitted at the trial of Mr. Scopes at Dayton, Tennessee, to state what the character of the scientific testimony would be if the specialists were permitted to testify, summed it all up by saying, "The series of proofs are so convincing that any informed man cannot doubt the probability of man's evolution." As I write I am almost swamped with books by the very highest authorities on the subject; I have taken a number of courses in our great universities, under the accredited teachers of evolution; I have been through the Museum of Natural History in New York, which contains the ocular demonstration of man's descent from lower animals, I have been giving a good degree of attention to the question for more than fifty years, and still I not only doubt, but emphatically deny even the probability of man's evolution. All along the line of the history of evolution there have been men of high rank in the scientific world who rejected the whole theory, especially that part of it which relates to man. Professor Virchow, of Berlin, recognized in his day as the foremost chemist in the world, and as the highest German authority in physiology, said, "It is all nonsense. It cannot be proved by science that man descended from the ape or from any other animal. Since the announcement of the theory all real scientific knowledge has proceeded in the opposite direction. The attempt to find the transition from animal to man has ended in total failure." He denounced the theory as dangerous to the state, and demanded that it be excluded from the schools.

---

[1] By Richard C. Wylie, editor-in-chief, Christian Statesman. *Christian Statesman.* 59: 24-7. September, 1925.

Professor Tyndale said:

> I share Virchow's opinion that the theory of evolution, in its complete form, involves the assumption that at some period or other of the earth's history there occurred what would now be called spontaneous generation; but I agree with him that the proofs are wanting. I hold also with Virchow that the failures have been so lamentable that the doctrine is utterly discredited.

Professor Lionel Beale declared that:

> There is not a particle of living matter of any kind which can be explained except on the view that it depends on God. . . . Man is made from the earliest period of his existence as a

structureless germ, and there is no evidence that he has descended from, or is, or was, in any way especially related to any other organism in nature through evolution or by any other process.

Professor Wilhelm Wundt, of Leipsic, one of the greatest, if not the greatest, of German psychologists, in his earlier life wrote books in support of evolution He is quoted as saying in his later years that these writings were "the crime" of his youth that would take him all the rest of his life to explain.

Dr. Ethridge, of the British Museum, said to be one of England's most famous experts in fossilology, is quoted as saying:

> In all this great museum there is not a particle of evidence of transmutation of species. Nine-tenths of the talk of evolutionists is sheer nonsense, not founded on observation and wholly unsupported by fact. This museum is full of proofs as to the falsity of their views.

Evolutionists have been at work for more than sixty years vainly trying to establish their doctrine by scientific evidence. Why do they still believe in it when the proof is lacking? Perhaps the answer given by Professor Louis Trenchard More, in his recent work on *The Dogma of Evolution,* is correct. He says (pages 21 and 22):

> The results of this investigation have been that, today, the evidence available supports our faith in a general law of evolution. We accept it as we accept the law of conservation of matter, not because it can be proved to be true from experience, but because without it natural law is not intelligible. The only alternative is the doctrine of special creation which may be true but is irrational.

Again on page 160 he says:

> The more one studies paleontology, the more certain one becomes that evolution is based on faith alone; exactly the same sort of faith which it is necessary to have when one encounters the great mysteries of religion. The changes that are noted as time progresses show no orderly and no consecutive evolutionary chain and, above all, they give us no clue whatever as to the cause of variations.

These are startling admissions, coming as they do from a noted scientist who believes in evolution. We find no fault with scientists for striving to go as far as possible in explaining phenomena in the natural world by the operation of natural causes. But they admit that they cannot explain certain phenomena in this way, and these are the very phenomena that must be explained before evolution can be accepted as an established scientific doctrine. The difference between us, anti-evolutionists and evolutionists, is this: we refuse to accept the dogma without evidence, while they, rather than admit the operation of supernatural power, accept the dogma without evidence. This statement is made because every alleged argument is disputed by certain scientists themselves.

Attention should be called to the admission that the cause or causes of evolution are unknown. Professor Osborn lays stress upon the distinction between the *law* of evolution and the *power* by which it is brought about. He says, "In contrast to the unity of opinion on the *law* of evolution is the wide diversity of opinion on the *causes* of evolution. In fact, the causes of evolution of life are as mysterious as the law of evolution is certain. Some contend that we already know the chief causes of evolution, others contend that we know little or nothing of them." But one of the principal things science is supposed to do is to explain natural phenomena according to the operation of natural law. How then can evolution be accepted as a settled scientific dogma when it is admitted by scientists themselves that they do not know the cause or causes by which it is brought about?

A few words should now be spoken in behalf of the Biblical account of the origin of man. The fact that there are physical resemblances between man and certain lower forms of animals proves nothing for evolution. It only proves that as far as we know God Himself has no better model according to which to fashion these bodies. But the chief thing to be accounted for is the spiritual nature of man. Some of my teachers strenuously held that there is no difference between the mind of a dog, a raccoon or a rat, and the mind of a man, except in degree of development. Give the animal plenty of time and it will equal man in intelligence. Of course, the absurdity of such a statement is apparent to any one who does any original thinking. According to the evolutionary theory the animal has already had as long a time to develop as man has had.

But the Biblical record informs us that God made man in His own image. If the entire man, body and soul, is the product of evolution, and this is what my evolutionary teachers held, it follows that the mind of the lower animals and the mind of man have the very same image. And if man has the image of God, so also have the lower animals.

Much nonsense has been written about the literal and the figurative interpretation of the Bible. Like any other book common sense must be employed in its interpretation. But there is no method of interpretation that can eliminate the true significance of the statement that man bears the image of God. There can be no doubt about the features that characterize this image. Turning to the New Testament, and taking the passages that speak of it in the most didactic manner possible, using language concerning the meaning of which the question of a literal or a figurative interpretation cannot be raised, we learn that this image consists in knowledge, righteousness and holiness. In proof of this statement turn to Ephesians 4:24, 2 Corinthians 3:18, Colossians 3:10. Evidently evolution, as now explained, cannot be harmonized with the Bible.

But this is not all. In Genesis 2:20 it is said that in the entire animal world there was not found a help meet for Adam. But on the evolutionary theory he must have had a father and a mother, and many other relatives in that world. And yet there was not one with whom, or with which, he could have real fellowship.

What a tremendous leap he must have made, all at once, and all alone!

It is folly in the superlative degree to make evolution, as now explained, a part of the curriculum of any school below the institutions of higher learning. In these higher institutions it should be handled by well balanced teachers who are able to detect the fallacies of the alleged arguments for the hypothesis, and to weight the arguments against it. And from the wild and fantastic imaginings of the great body of evolutionists may the good Lord deliver us.

THE CONFLICT OF FUNDAMENTALISM AND MODERNISM[1]

Sometimes the Fundamentalists are accused of being opposed to science. This is a mistake. In all my reading of their numerous writings I have never seen a word said against science *per se*, or any other kind of true knowledge. Indeed, some of the most eloquent tributes to the value and achievements of science that I have ever heard have come from the lips of fundamentalist speakers. Their writings, too, always give to science the proper meed of praise.

Here is a very recent utterance of Mr. Bryan. Some people scoff at him, even some good orthodox people—at least, some people who belong to orthodox churches. It should be remembered, however, that Mr. Bryan stands by the Holy Scriptures, and accepts all the doctrines it clearly teaches; therefore, he stands upon precisely the position of the evangelical churches whose confessions solemnly bind them to the acceptance and defense of the doctrines taught in God's Word. But I have no brief to defend him. What I wish to say is that only a short time ago he was asked this question:

---

[1] By Leander S. Keyser, D.D., Professor of Systematic Theology, Hamma Divinity School, Springfield, Ohio. *Lutheran Quarterly.* 55: 294-314. July, 1925.

"Do you think there is any conflict between science and religion?" To which he replied: "Contrary to a popular notion there is not. Science has rendered invaluable service to society; her achievements are innumerable. And the hypotheses of scientists should be considered with open mind. Their theories should be carefully examined and their arguments fairly weighed." Surely that is a fair enough statement. He was also asked this question in the same interview: "Do you think the teaching of evolution should be banished from the schools?" To this he responded: "Not if the student is very plainly informed that evolution is only a guess and that there is no more reason for believing it than any other unproved theory. The trouble is, the student is generally taught that evolution is as definitely established as the law of gravitation."

If intelligent Fundamentalists are the friends of science, why the present outcry? Simply and solely this: They are not convinced that theory of man's descent, or ascent, from an animal stock has been brought to that status of demonstration when it is entitled to be called by the honorable and sacred name of science. They distinguish between real science and the hypothesis of evolution. On the other hand, the Modernists identify them, because they are committted, body and soul, to the hypothesis of man's animal ancestry. On this score the Fundamentalists are constantly asking for one clearly proven case of spontaneous generation when they are dealing with those who uphold inorganic as well as organic evolution. The opponents of this theory point to the admission of Professor Lorande Loss Woodruff in a recent book, *The Evolution of the Earth and Its Inhabitants,* in which the professor declares a number of times that the law of biogenesis holds the field today among biologists of the first rank. Professor E. B. Wilson, of Columbia University, whom Professor Woodruff calls "the dean of American biologists," declares, in his book, *The Cell in Its Development and Inheritance*, that the immense gulf between living and non-living matter has become wider than ever by recent biological investigation. In a more recent work (1923), entitled *The Physical Basis of Life,* Dr. Wilson makes the same frank admission. So does Professor Vernon Kellogg in his book on *Evolution,* published in 1924. So the Fundamentalists are right in holding that the natural evolution of life by mere physico-chemical processes cannot be placed in the rank of science.

So far as regards organic evolution, these same opponents are asking over and over again for one plain case of the transmutation of species by resident or natural forces. Not a single case has been brought forward. There is an immense amount of speculation, of dogmatic assertion, of invective against the opponents of evolution, but the proof demanded has not been forthcoming. Everybody can clearly observe the law of fixity of type, but no concrete case of species transformation. If Darwin, Mendel, Burbank and Paul Kammerer have wrought marvels in bringing about new varieties within the boundaries of species, that does not mean that they are able to change one distinct species into another. Moreover, man by his intelligent manipulations is able to produce many new forms that nature left to herself would never produce. Man can make an automobile; nature herself never would produce an automobile. But the evolutionists hold that the evolutionary process has been going on for millions of years in the realm of pure nature, and ages on ages before man was born. Then why do we not see nature making some advancement today? There ought to be at least some slight, perceptible marks of improvement if progressive evolution is the dominant law of the cosmos. Instead of such an "upward urge" in nature, we find that outstanding law everywhere in organic life of each species reproducing "after its kind," just as the Bible teaches in Genesis I.

"Science is verified and systematized knowledge." Surely the theory of evolution has not reached that status. It is still in the hypothetical stage. Hence the Fundamentalists are right in their contention. In addition, it should be said that all the capable writers on the orthodox position maintain stoutly that the Bible and true science are in the most beautiful accord. They hold, too, that the Bible does not need to be twisted and distorted and manhandled in order to make it accord with the actually established findings of science. Just to give one instance: It seems to be pretty well established by scientific investigation that the various forms of life appeared successively from the lower to the higher, reaching their climax in man as a rational and moral being. Well, that progressive order agrees precisely with the teaching of the Bible. Again, common scientific observation proves that species reproduce true to form. That is the exact teaching of the Bible—each bearing "after its kind." All kinds of empirical science, especially psychology, ethnology, ethics and theology, find that man is a dual being, constituted of soul and body. Just so the Bible depicts man from his creation in the Garden of Eden to his translation to glory in the book of Revelation. Again, true science finds man a being of a different genus from the animals, a being endued with a rational, self-conscious personality, capable of continual progressive, keen perception, abstract thinking, high ideals and aspirations, moral discernment and spiritual fellowship and experience. That is precisely the differentiation the Bible makes between man and the animals, which were made by the Almighty to serve mankind. In these ways and many others the Bible and true empirical science are in the most perfect accord.

IS MAN A CREATION OR AN EVOLUTION [1]

Looking at the whole field, there is nothing else quite so reasonable as faith, which is simply accepting the testimony of God; while there is nothing so unreasonable as unbelief which denies not only the teaching of God but also of nature, and makes a futile attempt to make nature teach what she refuses to teach. The Bible gives an adequate account of the origin of man and supplies the mind with what it demands when it sees order and purpose at work, namely, a brain that orders and a will that purposes, something that evolution does not supply and so contradicts one of the fundamental laws of psychology. The law of design has never been overcome by the theory of evolution. We have intimated that there are three great gaps for which evoluion has no bridge, the places where matter, life, and man come onto the stage. It is significant that at these very three vital points Genesis uses a special word for "created," the word "bara" in the Hebrew, Genesis 1:1, 1:21, 1:27. In the twenty-seventh verse, where man is created, the word is used three separate times. When man's body is spoken of in creation, an entirely different word is used, the word, "yatsar," which means to shape or fashion rather than create, which corresponds with the Bible teaching that man's body was formed out of what had already been created, but that his spirit was a definite creation, and not an evolution.

---

[1] By the Rev. C. J. Williamson, D.D., Pastor of Highland United Presbyterian Church, New Castle, Pa. Excerpt reprinted by permission from pamphlet. Copyright, 1924 by the United Presbyterian Board of Publication.

The great pity is the effect the teaching of the theory of evolution is having on little children and young people. The theory is taught without hindrance in our schools and colleges because it is called "science," while the money of the tax-payer is used to pay for instruction of this kind, and yet the accepted canons of education hinder the teaching of the Word of God which even so ardent an evolutionist as H. G. Wells admits is at the very basis of our civilization. Stories and histories of the Bible are written by atheistic evolutionists, who, like Van Loon, reveal so baldly that they have never even read the Bible thoroughly enough to be familiar with its facts, but reveal just as baldly that their one idea is propaganda to keep children from believing in the supernatural but to cause them to set up the brass image of evolution to worship instead of God. It is little wonder that the statement is so often made that it is doubtful if a Christian young man or woman can go through a university course in any university in America and come out a believing Christian.

The more we read the books of evolutionists, the more we believe that the attacks, scientific and logical, made on their long-held position are rousing that great resentment that comes when a position we have wanted to hold true is proved to be untrue, and we attempt to hoodwink ourselves and others by the loudness and assurance of our voices instead of meeting fact with fact. The more we study the matter on its physical and moral and spiritual side, the more do we agree with David when he sings, "Thou hast made him but little lower than God"; with Joyce Kilmer when he declares, "Poems are made by men like me, but only God can make a tree"; and with Carruth in his lines:—

A fire-mist and a planet,
A crystal and a cell,
A jelly-fish and a saurian,
And caves where the cave-men dwell.
Then a sense of law and beauty,
And a face turned from the clod—
Some call it Evolution,
But others call it—God.

EXCERPTS

Notwithstanding the fact that Darwinism is no longer believed in the circles in which it originated, its influence for harm was never so great as now. The reason is that the theory has found its way into the theological seminaries, and into the school-books of children, where it is doing its deadly and truly devilish work of discrediting, in the eyes of many, the statements of the Word of God. —*Mr. Philip Mauro, from "Evolution at the Bar."*

The real question at stake in Tennessee and in every other state in the Union, as well as in all the civilized world, is not whether "evolution" may be taught, but what kind of theory of evolution may be taught. If the whole civilized world allows professors to teach that man is only a highly developed animal, we shall witness, not what H. G. Wells so often calls "the race between education and catastrophe"; we shall witness the race of education towards catastrophe.—*From editorial in the Catholic World. July,* 1925.

The Bible is the best text book on Biology that has ever been written. Separate religion and science? God has not done so. Read the 19th Psalm. "The heavens declare the glory of God." Here we have the Astronomer's chart and the glory of God in the same verse. "The firmament" that mighty host, sun, moon and stars, are called God's handy work. Day and night, coming and going each tell their story, each praising God. Then that beautiful personification of the sun and next, in the 7th. verse a great gospel sermon—"The law of the Lord is perfect converting the soul: the testimony of the Lord is sure making wise the simple."—*Garrett Reed, in the Baptist Monthly Magazine for June,* 1925. *p.* 48.

The principle of separation of church and state in America makes impossible the direct teaching of religion in public schools. By implication anti-religious propaganda is also excluded. The Northwest Ordinance of 1787 declares that religion is to be encouraged.

The common law back of the Constitution recognizes Christianity as part of the law of the land. This has been expressly stated in a Pennsylvania court decision. Legislation prohibiting teaching contrary to Christianity is thus probably constitutional. The difficulty of such legislation will lie in the definition of terms and the administration of the law.—*Abstract of article by Carl*

Zollman, "Constitution and Legal Aspects of Religion in Public Education." Journal of Religion. May, 1922.

Either creation is true and evolution is false, or else evolution is true and creation is false. Either we must accept the revelation of a Christian God, and His creative and redemptive activities as given in the Bible, or we must utterly reject this and turn to the infidel philosophy of chance and materialism.

In other words, there is no such thing as so-called "theistic" or Christian evolution. Such terms are misnomers. Christianity is a religion founded on definite historical facts. These facts—including the creation of the world, and the creation, fall and salvation of man—are recorded in the Bible. If, therefore, the Bible is rejected, Christianity itself is rejected. In the face of the essential nature of evolution, and in the light of definitions of it already given, the terms "Christianity" and "evolution" are mutually exclusive and self-contradictory. If it is Christianity, then it is not evolution; and if it is evolution, then it is not Christianity.—*John Roach Straton, Pastor, Calvary Baptist Church of New York City, in debate with Charles Francis Potter.*

Education, however, is the field of battle, and a teacher may perhaps grant something to the other side. Evolution is a theory of creation. There are other theories, and some of them, held by thousands of well-meaning people, may not be taught in the State schools of certain countries. Perhaps it is just as well not to teach any theories. A teacher who is not himself an investigator is liable to be too dogmatic and to bring forward a theory as a ready-made explanation of matters which he is really (like the rest of us) unable to explain. The right of free thought and free speech is one thing; the guidance of the young is another.

As a paleontologist I should be quite prepared to teach facts, leaving their philosophical interpretation for later years. The intelligent among my pupils would probably come to the same broad conclusion all paleontologists have come to, and they would have had a better intellectual training than if the theory had been forced into them.—*F. A. Bather, D.Sc., F.R.S., Keeper of the Department of Geology, British Museum. Nature.* 116, *sup: 77. July* 11, 1925.

In asking that teachers shall not teach the theory of evolution, we are not making the individual faith of the teacher a qualification for office. All we demand is that he does not use his tax-supported office as a center for propaganda of his religious views. For example, it does not matter one whit whether the teachers in our schools are Baptists, Methodists, Presbyterians, Unitarians, Catholics, or adherents of any other religious persuasion. But it does matter if a Baptist teacher, for instance, should use his desk in the public schools for the propagating of religious ideas peculiar to the Baptist denomination. And likewise, in the issue before us to-night, it is not what religious views a teacher may have; but the question is, Has he the right to use his office in a public school to impress his idea of religion on our school children? We are not trying to forbid the employing of any teacher who believes evolution. We only demand that he cease using his position as a propaganda center for his doctrine.—*Alonzo L. Baker, in debate with Maynard Shipley on the question of debarring the teaching of evolution from tax-supported schools.*

In California, where the problem is critical, the spokesman of the Fundamentalists is the Rev. George L. Thorpe of Corona. I have a letter from Mr. Thorpe outlining his position. Here are some excerpts from it:

> I am a father pleading for the soul's eternal welfare of my two boys and their Christian citizenship and future welfare of our country. Evolution undermines both, creates lawlessness,

and produces atheists. I have over two hundred cases definitely reported to me where young people went from Christian homes to colleges, high schools, or universities, and came home evolutionists and atheists; therefore by its fruits shall it be known.

My work is for everybody that believes in a living Creator and that the Bible is His revealed will and word. I am working for every boy and girl in California, whether they be Catholic, Protestant, or Jew, against teaching a theory or hypothesis for an established fact which it is not right to teach any young person. . . . To teach atheism camouflaged under the name of science or scientific research is a fraudulent and deceptive counterfeit. There is no conflict between the Bible and true science, but there is a terrible conflict between the Bible and false evolution. . . . Why should the people be compelled to pay taxes to support schools to have their own children's faith in God shattered and Christian lives destroyed, and a foundation laid for the future disintegration of our nation, departing from the fundamental principles of justice and righteousness set forth in the Bible on which our forefathers founded this nation? —*From article "War Against Evolution" by Miriam Allen De Ford. Nation. May* 20, 1925. *p.* 565.

The recent general uprising against the teaching of evolution in our schools has brought forth the charge that Christians are attempting to force the Bible as a textbook upon State schools. There are those who are no doubt sincere in this contention; while others are evidently making this charge to divert attention from the real issue. Those who are protesting, and will continue to protest against the teaching of evolution in our schools, have not asked that the Bible be made a textbook in these institutions. They do not believe in a combination of Church and State. On the other hand, they are vigorously opposed to a combination of Infidelity and State. Since the Bible is not taught in these schools, those of us who believe the Bible to be the very word of God feel that we have all the more right to request that instruction in these institutions should not be contrary to and subversive of the teaching of the Bible. If Bible teaching is eliminated, we must insist that it shall not be discredited, derided and denied. We have not contended that Christ shall become a part of the curriculum, but we do earnestly contend that

He shall not be crucified on the cross of false philosophy, called evolution.—*Preface to "Evolution—a Menace" by J. W. Porter.*

Opposed to the Bible account of man's creation is the theory of evolution. The word *theory* is used advisedly, for today evolution is a mere arbitrary dictum and all who assert the contrary do so without regard either to evidence or truth. There is no law in any state that forbids teachers *explaining the theory* of evolution, but in several states the law forbids teaching the theory as an *assured result,—an established fact* of science. The pity is that there is not such a law in every state of the Union. While it might not do great harm to have explained to high school and college boys and girls some of the mere *speculations* of scientists, on the other hand it would do no good, nor would it serve the purpose of education for which children are sent to school often at the cost of great sacrifice on the part of parents. But whether Christians or otherwise no intelligent parent desires to have a child imposed on and deceived by being taught in the name of education that unproved fads are undeniable facts established by science. This is being done all over the country today by teachers of evolution, and whether avowed or not their purpose is to discredit the Genesis story and to destroy faith in the Bible as the word of God.—*E. M. Milligan, D.D. in "Science and the Bible." p.* 15-16.

My friends, Evolution may be true. Let us assume it for the moment. We are not discussing the objections to it from the scientific point of view. That will come at another time. All that we are insisting upon at present is that a Christian cannot be an evolutionist. An imaginary evolutionist, as another speaks of him, may call himself a Christian, but a real Christian cannot imagine himself an evolutionist. Why? Because a Christian must believe in the Scriptures, he must believe in Christ, he must believe in redemption. He must believe in some other things, but these three are what Paul is here setting before us as the definition of Christianity, and these are enough. These things are supernatural. They are gaps, they are breaks in the continuity of development. The first requirement of continuity is that nothing shall happen in nature that is opposed to the course of nature, and all these things have so happened, or else Christianity is a fake. All these things have so happened, or else our preaching is void and your faith is also void. Yea, and we are found false witnesses of God. Do you believe that? Are you prepared to assent to that? Until you are so prepared to do, you are not prepared to call yourself an evolutionist.—*Rev. James M. Gray, President of the Moody Bible Institute. From pamphlet "Why a Christian Cannot Be an Evolutionist." Copyright,* 1925.

The teachers of evolution have very little to complain of in this country. They certainly are enjoying large liberty. One of the school-teachers in Louisville a few days ago, told the children that, "while we did not wish to acknowledge that apes were our ancestors, a thousand years from now there would be developed a race of people so far superior to us that they would be just as much ashamed to acknowledge us as their ancestors as we are ashamed to acknowledge apes as our ancestors." That's large liberty! Such an ignoramus is utterly unfit to have under him the instruction of children; but the state of Kentucky not only permits them to teach such nonsense, but hires and pays them a large salary to do so; not only that, but has a law compelling parents to send their children to such a teacher. Mr. Vincent nor any one else need to worry themselves about the liberty of the evolutionists.

It is not impossible, however, that the time may come when the people in Kentucky who pay the taxes will insist that they have some right with reference to what kind of instruction their children will have in the public schools. They insist that taxation and representation should fellowship together. It is a well known fact that evolution, as taught in our universities, is not a demonstrated science and is in conflict with the Bible.— *H. C. Morrison in the Baptist Monthly Magazine for June,* 1925. *p.* 81-2.

Mr. Malone's statement about Mr. Bryan is just another illustration of the fact that we are facing an organized revolt against the real religion, a theory led by men like Malone, who think they have a religion, and men like Darrow, who don't know what they think. They are the modern religious radicals, and they have joined with the political radicals in the doctrine of unbelief. They reject God's word. We are at the supreme crisis of religious thought.

When Mr. Malone calls Mr. Bryan the leader of a "sinister movement" he is characterizing as "sinister" the whole faith on which America was founded—God's word, which made America great, which taught the sanctity of marriage, honesty and honor, the acknowledgment of God. For Mr. Bryan did not stand for any new thing. He stood for the old religion, as I do. Ours is a defensive war; theirs an aggressive one.

The radical movement is based on a materialistic, Godless philosophy; upon the revival of the evolutionary philosophy. Theirs is the sinister movement. It is more sinister than were the doctrines of Voltaire, Tom Paine, Hume and Ingersoll. For these men only denied.

The new movement, designed for the purposes of political and religious revolutionaries, is far more insidious, made up of infidelity cloaked by so-called science. They have put God aside, they have put Jesus Christ aside for a new infidelity based on a false science.—*Reverend John Roach Straton, Pastor, Calvary Baptist Church, New York City. From sermon reported in the New York World, September* 21, 1925.

IN FAVOR OF TEACHING EVOLUTION

CAN CHRISTIANITY WELCOME FREEDOM OF TEACHING?[1]

The opposition to the teaching of the doctrine of evolution has for some time been organized and vigorously pushed by the group of conservatives known popularly as "Fundamentalists." In the report of a committee on schools and colleges, at the World Conference on the Fundamentals of the Faith in Philadelphia held from May 27 to June 1, 1919, the concluding paragraph reads as follows:

> And finally resolved, That in our colleges, especially, the teaching that man has descended or ascended from brute beast is not only unsupported by any unquestioned facts and therefore totally unscientific, but is a distinct denial of the Bible account of the creation of man, the beginning of sin, the plan of salvation, and the extension and triumph of the Christian religion in the world.

The doctrine of evolution appears in this report as only one of several doctrines which are declared to be subversive of Christian faith. All others are distinctively church matters, such as the inspiration of the Bible, the historicity of miracles, and the redemptive work of Christ. The Fundamentalists have for several years been vigorously carrying on a campaign to rid schools under church control of all "infidel, atheistic education." The doctrine of evolution has been one of the doctrines under condemnation.

In recent months, Mr. William Jennings Bryan has been advocating legislation which shall apply to public schools. The only alleged anti-religious doctrine in the

---

[1] By Gerald Birney Smith, Professor of Christian Theology, University of Chicago. *Journal of Religion.* 2: 245-62. May, 1922.

Fundamentalist's list which would find a place in these schools is the evolutionary hypothesis. Hence this has been singled out for especial attention. At the same time the history of the movement shows that the campaign against evolution is only part of the larger program proposed by the committee on schools and colleges at the Philadelphia conference.

According to this view the employment of "higher criticism" in the study of the Bible, the denial or modification of certain doctrines hitherto prominent in evangelistic preaching, and the teaching of the doctrine of evolution are all condemned for one and the same reason. Those who hold and teach these positions are ruining the religious faith of the younger generation. Says Mr. Bryan:

> Those who teach Darwinism are undermining the faith of Christians; they are raising questions about the Bible as an authoritative source of truth; they are teaching materialistic views that rob the life of the young of spiritual values. . . . A teacher might just as well write over the door of his room, "Leave Christianity behind you, all ye who enter here," as to ask his students to accept an hypothesis directly and irreconcilably antagonistic to the Bible.

The deliberate destruction of the religious faith of a generation of students is certainly not a matter to be passed over lightly. If there actually exists any such situation as is depicted by those engaged in the present campaign against higher criticism and evolution, it demands the serious attention of all high-minded citizens. In the absence of more definite knowledge on the subject, the lurid portrayal of the inroads made by "infidelity" and "atheism" into the religious beliefs of students is sure to cause widespread public concern. If public opinion can be sufficiently aroused, legislation will be introduced to put a check to the alleged irreligious influences in our schools. The fact that when the matter was brought to a vote in the Kentucky House of Representatives, restrictive legislation failed by only one vote shows what may happen if people generally shall come to believe that the contentions of the Fundamentalists are justified.

Moreover, such an attempt as that just made in Kentucky is probably entirely constitutional. The article in this issue of the *Journal of Religion* by Mr. Zollmann indicates clearly that the influence of the Christian religion is distinctly encouraged and sanctioned in constitutional and legal pronouncements. Mr. Bryan makes a telling point when he insists that after Christian people have consented to the elimination of all positive religious instruction from the public schools it is intolerable that this situation should be used to permit a definitely anti-religious propaganda in the schools. Says he:

> The Bible has in many places been excluded from the schools on the ground that religion should not be taught by those paid by public taxation. If this doctrine is sound, what right have the enemies of religion to teach irreligion in the public schools? If the Bible cannot be taught, why should Christian taxpayers permit the teaching of guesses that make the Bible a lie?

To one who has been accustomed to scientific methods of reaching conclusions, the presuppositions and implications of this attack on evolution are at first sight ridiculous. There is a strong temptation to laugh the whole procedure down. There are plenty of sincere Christian teachers deeply concerned for the religious welfare of the students under their charge, who are employing critical methods of studying the Bible, and who are sympathetically in touch with the developments of science. For such men suddenly to find themselves called "infidels" and "enemies of religion" is bewildering. It seems so absurd that the first impulse is to regard it as a huge joke. Moreover, the naiveté of the Fundamentalists when they touch the content of science would be amusing if it were not accompanied by so evident a moral passion. But to treat this reactionary movement with ridicule will certainly not help matters. The advocates of placing restrictions on freedom of teaching in the interests of religion are in deadly earnest. They feel themselves to be the representatives of a holy cause. Any ridicule of their contentions is regarded by them as simply one more evidence of a ribald spirit of irreligion which must be extirpated.

The method proposed by the Fundamentalists and advocated by Mr. Bryan is so disastrous to spiritual interests that it must be resisted by all who have the real welfare of humanity at heart. It proposes to substitute for the method of free research the method of prescribing by law what shall be taught in educational institutions. Such a proposal would mean that future generations would be defrauded of the discoveries which may be made if men are free to search for the truth. Said Froude:

> If medicine had been regulated three hundred years ago by Act of Parliament; if there had been Thirty-Nine Articles of Physic, and every licensed practitioner had been compelled, under pains and penalties, to compound his drugs by the prescriptions of Henry the Eighth's physician, Dr. Butts, it is easy to conjecture in what state of health the people of this country would at present be found.

Equally, if biologists be compelled by law, under pains and penalties, to teach only what is demanded by the group represented by Mr. Bryan, it is easy to conjecture the ultimate outcome so far as real knowledge is concerned. In view of the fact that the intelligent understanding of the problems of medicine today is so closely related to biological research, and the further fact that such research involves the recognition of an intimate interrelationship between the vital processes in man and those in animals, it is not saying too much to declare that such a bill as that happily defeated in Kentucky is virtually a conspiracy to defraud future generations of the biological knowledge which should be rightly theirs. Its proponents belong in the same class as those who formerly opposed vaccination and the use of anaesthetics on religious grounds.

It is here that we come upon the most appalling aspect of the campaign. The complete failure to recognize the priceless value of the scientific spirit is disheartening. Mr. Bryan's clever identification of a scientific hypothesis with a "guess" is a case in point. By calling the evolutionary hypothesis concerning the origin of species a "guess," he finds it possible to ridicule the proposal that teachers should be permitted to teach irresponsible guesses when these controvert the Bible. By this gross misrepresentation he discloses a superficial flippancy which bodes ill for the spiritual honesty of the cause which he represents.

It ought to be understood by every man of intelligence today that a scientific "hypothesis" is a carefully formulated provisional statement to be used in furthering more exact research. Whenever facts are discovered which were not taken account of in the first hypothesis, the hypothesis itself is revised so as to include the new discoveries. In this way a scientific hypothesis is a method of coming closer to the truth. It is at the farthest removed from an irresponsible "guess." A hypothesis is the best theory which accounts for all the facts so far as these are known. Any hypothesis is modified whenever the evidence requires it. It is called a "hypothesis" expressly to avoid dogmatically closing any investigation before all the facts are carefully considered.

The misunderstanding of the nature of a scientific hypothesis robs some contentions of any real significance. One of the most frequently used arguments is to the effect that Darwinism has already been abandoned by modern scientists. This is no news to biologists. Darwinism is simply one of the pioneer formulations of the evolutionary conception. In the fifty years or more of research since his day, the Darwinian hypothesis has, of course, been modified. Some of his suggested solutions have been found to be inadequate. But the many modifications of theory during these years have brought a steadily increasing unanimity as to the fruitfulness of the conception of evolution. To abandon Darwinism does not mean that the anti-evolutionists are right. One of the clearest statements of the precise status of the doctrine of evolution is given by Professor H. H. Newman, as follows:

> The nature of the proof of organic evolution, is this: that using the concept of organic evolution as a working hypothesis it has been possible to rationalize and render intelligible a vast array of observed phenomena, the real facts upon which evolution rests. Thus classification (taxonomy), comparative anatomy, embryology, paleontology, zoogeography and phytogeography, serology, genetics, become consistent and orderly sciences when based upon evolutionary foundations, and when viewed in any other way they are thrown into the utmost confusion. There is no other generalization known to man which is of the least value in giving these bodies of fact any sort of scientific coherence and unity. In other words, the working hypothesis works and is therefore acceptable as truth until overthrown by a more workable hypothesis. Not only does the hypothesis work, with the steady accumulation of further facts, the weight of the evidence is now so great that it overcomes all intelligent opposition by its sheer mass. There are no rival hypotheses except the outworn and completely refuted idea of special creation, now retained only by the ignorant, the dogmatic, and the prejudiced.

Anyone familiar with the work of scientists at first hand knows that the scientific attitude involves a humility in the face of the facts which prevents premature dogmatism. The address of Professor William Bateson at Toronto in December, 1921, is being quoted—in spots—by the anti-evolutionists; for Professor Bateson frankly admitted that nothing is yet scientifically known concerning the origin of species. This seems, at first glance, like a confirmation of the statement that evolutionists are simply engaged in guessing; and it is being thus used by the Fundamentalists. It rhymes well with their other citations from scientists to the effect that Darwinism is now discredited. But the concluding paragraph of Professor Bateson's address deserves attention; for it shows how far removed is his attitude of scientific honesty from the dogmatic attitude of anti-evolutionists. Said he:

> I have put to you very frankly the considerations which have made us agnostic as to the actual mode and processes of evolution. When such confessions are made the enemies of science see their chance. If we cannot declare here and now how species arose; they will obligingly offer us solutions with which obscurantism is satisfied. Let us then proclaim in precise and unmistakable language that our faith in evolution is unshaken. Every available line of argument converges on this inevitable conclusion. The obscurantist has nothing to suggest which is worth a moment's attention. The difficulties which weigh upon the professional biologist need not trouble the layman. Our doubts are not as to the reality or truth of evolution, but as to the origin of species, a technical, almost domestic problem. Any day that mystery may be solved. The discoveries of the last twenty-five years enable us for the first time to discuss these questions intelligently and on a basis of fact. That synthesis will follow on analysis we do not and cannot doubt.

In other words, the hypothesis of evolution is an indispensable instrument for scientific research; although no one is yet in a position to declare finally just what is the exact process by which new species arise. Scientists today await the detailed researches of scientists in the future in order to construct a theory which shall account for all the facts in detail.

There is in this scientific attitude something so fine in its spirit of humility and devotion that it should be welcomed by religion. To be willing to follow the leading of the facts when these have been surely identified, to trust to the cooperative labors of scientists everywhere to contribute to a constantly growing knowledge of the world in which we live, to use hypotheses in so honest a way as to provide for their constant modification in the interests of truth—all this is what we sorely need to save us from faddists and undisciplined enthusiasts. And this Mr. Bryan caricatures as an irresponsible attitude in which a "guess" is made supreme! It bodes ill for a religion if its advocates are incapable of appreciating the spiritual value of scientific honesty. This has been caustically expressed by President Hopkins of Dartmouth College in the following words:

> The minute that education becomes something besides a sincere and open-minded search for the truth it has become a pernicious and demoralizing influence rather than an aid to society and an improver of civilization. . . . If the spirit of propaganda is to be enshrined above that of the spirit of truth, the master of lies is going to be given a considerably greater prestige in the world than he has had before even, and this will be at the expense of the cause of Him who said: Ye shall know the truth and the truth shall make you free."

To one who has the scientific temper, such a proposal as that made in Kentucky argues a suspicious weakness. If religion is in such a bad case that it cannot hold its own in a free discussion, there must be something fatally wrong about it. The campaign against the teaching of evolution will be sure to create in the minds of scientists a feeling of suspicion and hostility toward a religion which betrays such a lack of trust in the ability of truth to vindicate itself. Thus instead of winning teachers of science to a more sympathetic attitude toward religion, it is bound to have the precisely opposite result. Indeed, the animus exhibited in typical controversial utterances, the inability or the unwillingness to debate fairly, the resort to ridicule, the calling of unpleasant names—these go far to make extremely difficult the cooperation of a man of reverent scientific spirit with a type of religion which vilifies and misrepresents. And when it is proposed to incorporate this purpose into law and to enforce the law by penalties, one is appalled at the disastrous results to religion itself. If the teaching of religion can be secured only by threats, where is its spiritual power?

Those who know and love historic Christianity must enter a protest against this movement in the name of Christianity itself. To restrict Christianity to the ideas contained in the Bible is to substitute for real Christianity the scribism which Jesus and Paul repudiated. That the great religious ideals so potently set forth in the Bible are central in Christian faith no one denies or wishes to deny. But even the most rigid literalist recognizes that there are customs and ideas in the Bible which were appropriate to a certain stage of development, but which would have little or no meaning today. The exact reproduction of the system of sacrifice commanded in the Old Testament would be everywhere recognized as unwise and unnecessary. Few Christian communities today would venture to put into practice the injunction of the apostle Paul that women should keep silence in the churches. Even Mr. Bryan probably accepts the Copernican astronomy without suffering shipwreck of his faith. The plain fact is that historic Christianity has been so creatively vital that it has been able in the past to make such modifications in traditional doctrines and practices as shall be necessary in order to continue to be a vital force in the ever-enlarging knowledge of men. For any group of men to call a halt to this century-long characteristic of Christianity is to misread our religious history.

Mr. Bryan disclaims all intention of coercing belief. He insists that those who want the doctrine of evolution taught have a perfect right to found schools where their pet doctrine may be taught. But he assumes that Christians do not want evolution taught, and that it is wronging these Christians to permit it to be taught. He entirely overlooks the fact that most Christians want the truth-seeking spirit to prevail in education. For Christians to demand that fixed dogma shall be taught rather than that an honest quest for the truth shall be encouraged would lead to intolerable difficulties. Among the various branches of Christianity, which one is to be singled out as right when they disagree? Is it not rather in accordance with the spirit of historical Christianity to be eager to share so completely in the best learning of its day as to be able to correct imperfect theological opinions when correction proves to be necessary in the interests of the truth? Everyone really wants to know the truth about the origin of the human species. Is there any way in which to find out the truth except by the patient research of scientific specialists? Was there any other way in which to ascertain whether the Copernican astronomy was true or false? Shall men, in the name of Christian loyalty, be permitted to initiate a policy of repression the purpose of which is to discourage that very process of scientific research by which alone the truth can be established? It should be made clear that the protest against such a policy comes not simply from scientists (who might conceivably be discounted on the hypothesis or "guess" that they are irreligious) but from those who are ardent Christians, and who believe that Christianity in the future as it has done in the past will welcome as part and parcel of religion itself the scientific spirit of loyalty—a spirit which forbids any cheap and easy way of being satisfied with doctrines, but which would make the attaining of truth a constant exercise of the spiritual life.

The method proposed by the Fundamentalists is that of outlawing everything which raises critical questions concerning the traditional beliefs. The word "authority" has a foremost place in their conception of religious faith. Our beliefs are represented as ideas which are furnished to us by divine authority, and which we are under obligation to accept because they are thus prescribed. Anything which tends to weaken or destroy this conception of authority is denounced as being irreligious. Now the ominous fact faces us that the development of modern education has introduced a different method—that of discovering the truth by careful critical investigation. And such investigation inevitably leads to revisions of opinions previously held. This is just as true in the realm of opinions about religious matters as anywhere else. In so far as the methods of study now approved in colleges and universities are seriously used, students are sure to be led to a critical re-examination of the opinions with which they came to college. And this means substituting the method of critical inquiry for the method of "accepting" ready-made doctrines.

The Fundamentalists propose to outlaw this method of education. They insist that the conception of accepting beliefs on the basis of authority shall be preserved. The gist of the argument against evolution is that it is contrary to what the Bible teaches. Consequently, in the interests of religious faith, teachers must be restrained from teaching anything contrary to the Bible.

Now it must be admitted that a person who is prepared honestly to submit every decision to the authority of the Bible is apparently ready for aggressive Christian service. The devotion and zeal of such persons are evident. They often exhibit an ardor which, superficially regarded, seems more religious than the more modest attitude of an inquirer. But the fatal limitation of this way of attaining a unified consciousness is that it involves a cruel attitude of dogmatism toward those who cannot honestly take that position. When an authoritarian meets a person who has inner difficulties about reaching his own conclusions, he has no proposal save the necessity of submitting to authority. An appeal to authority, however, in the last resort is an appeal to force. If a person will not voluntarily yield to authority, he must be made to yield. There is thus no absurdity seen in a proposal to hold over the head of any teacher of biology the legal penalty of a fine of $5,000 and a year's imprisonment if the result of his teaching is to impair the hold of a certain dogma of religious authority on students. The question may be fairly asked whether a religious policy whose final appeal is force deserves the name Christian at all. There are those of us who believe that the last word in Christian devotion is love rather than legal coercion. The most painful thing about the attitude of authoritarian zealots is their conspicuous lack of Christian love. They prefer the sound of trumpets and the clash of arms to the less conspicuous methods of love. They draw their own analogies from the military world rather than from the ministry of Jesus.

Happily, the days are past when coercion in religion could be carried to its logical conclusion of physical torture and even death. But it is possible to outlaw certain teachings if popular sentiment demands it. Therefore, the effort is being made to secure a majority who will vote to exclude from teaching positions those who do not bow to the authority proclaimed by the Fundamentalists. The campaign thus inevitably takes the form of political agitation, either in the state at large, as in Kentucky, or within the various religious denominations, as in the case with the Baptists and the Disciples. But political agitation has its great spiritual dangers. The supreme aim is to get a majority vote. The popular orator comes to the front. The irresponsible spreading of discreditable rumors concerning the other party is encouraged, until the "campaign lie" has come to be a regular feature of our politics. Clever debate takes the place of reverent search for the truth. Partisanship rather than carefully thought-out patriotism is promoted. All these evils, so common in secular politics, are being introduced into the realm of religion by the Fundamentalists. There is real danger lest thousands of men shall be led to suppose that they are experiencing a religious consecration when in fact they are only responding emotionally to the crowd-psychology used so successfully by all demagogues.

All this is involved in the attempt to secure religious uniformity by coercion. And if the attempt should succeed, it would compel numbers of conscientious disciples of Christ to endure the stigma of being classed as irreligious. Surely no one seriously desires such an outcome.

To those who know both in their own experience and by their observation of others that a devout Christian faith is entirely compatible with an acceptance of the principles of higher criticism and with a cordial attitude toward the findings of modern biologists, it seems like nothing less than a tragedy that a needless burden of anxiety should be laid on the students and teachers in our schools and colleges. There is no desire on the part of the modern teacher to "indoctrinate" a student. The aim of education is to develop the capacity to discover the truth. The only possible adverse criticism of religion would be directed against a kind of religion which resists the truth. The effort is to introduce students to a method of critical inquiry which will lead them to the formation of conclusions on the basis of a careful study of the facts.

So far as this attitude is concerned with religion, it will, of course, lead the student to ask critical questions concerning his religious beliefs. It will almost certainly lead to a discovery of the formidable difficulties in the way of holding certain conceptions of biblical authority—conceptions which are justified only by the quoting of a few proof-texts, and which cannot for a moment stand on the basis of an examination of the facts. But it leads also to large and inspiring views of religion and challenges the honest inquirer to face the question of his own personal loyalty to the ends which religion promotes.

When it is discovered that religious faith does not stand or fall with the affirmation or the rejection of certain arbitrary doctrines, a new sense of confidence comes. Then the teacher with the scientific spirit trusts the inherent power of the ideals of the Bible and the gospel of Jesus to bring their own convincing message. The student is led to incorporate these ideals in his philosophy of life because he learns to love them, not because he is commanded to "accept" them on the basis of authority. Religious consecration is brought about with the consciousness of entire freedom. The way is open for modifications of religious beliefs whenever these seem to be required by the facts. The analogy between scientific processes and the gradual development of religious beliefs is a potent means of steadying the religious life of many students today, who would be only bewildered if they were confronted point blank with the alternative of "accepting" or "rejecting" a theology which seemed to them questionable. If a student knows that he can take all the time he needs to work out his religious questions, but that while he is working them out he ought to be practicing the best kind of religious faith which he can honestly entertain, the way is open for a wholesome growth into a richer and larger knowledge.

The present ferment in religious thinking will prove to be a mighty influence in turning the attention of men to religion, if it is not transformed into an occasion for inquisition. Indeed, the campaign against evolution seems to be having an effect quite different from that intended by Mr. Bryan. Thousands of people, who would otherwise have remained apathetic, are being stirred up to discover what it is all about. A remarkable movement of popular education is going on. It is to be hoped that those who now enjoy complete freedom of teaching will seize the opportunity to indicate clearly that Christian faith has no need to fear critical investigation. In past centuries Christianity has had an enviable reputation as a supporter of the best learning. We cannot consent that this reputation shall be lost, as it will be lost if the reactionary movement is permitted to go unchallenged. Many of the most prolific movements in the history of the church have grown out of dissent from an authoritatively fixed theology. Freedom is always creative. When religious beliefs have to be enforced by law or compelled by assent to "authority" or made dominant by political scheming, it is a sure sign that that kind of religion has lost its spiritual power. In the interest of the vitality of Christian faith, freedom of investigation and freedom of teaching should be advocated by all who really believe that religious faith should seek the truth always and under all circumstances.

THE PROPOSED SUPPRESSION OF THE TEACHING OF EVOLUTION[1]

Evolution takes its place with the gravitation law of Newton. It should be taught in our schools simply as nature speaks to us about it, and entirely separated from the opinions, materialistic or theistic, which have clustered about it. This simple, direct teaching of nature is full of moral and spiritual force, if we keep the element of human opinion out of it. The moral principle inherent in evolution is that nothing can be gained in this world without an effort; the ethical principle inherent in evolution is that the best only has the right to survive; the spiritual principle in evolution is the evidence of beauty, of order, and of design in the daily myriad of miracles to which we owe our existence. This is my answer to Mr. Bryan's very natural solicitude about the influence of evolution in our schools and colleges—a solicitude not inherent in the subject itself, but in the foolishness and conceit of certain of the teachers who are privileged to teach of the processes of life.

It would not be true to say that the evolution of man rests upon evidence as complete as that of the horse, for example, because we have only traced man's ancestors back for a period of four hundred thousand years, as geologic time was conservatively estimated in 1893 by Secretary Walcott of the Smithsonian Institution, Washington; whereas, we have traced the horse back for a period of three million years, according to similar estimates of geologic time.

The very recent discovery of Tertiary man, which I have just described in *Natural History* (November-December, 1921), living long before the Ice Age, certainly capable of walking in an erect position, having a hand and a foot fashioned like our own, also a brain of sufficient intelligence to fashion many different kinds of implements, to make a fire, to make flint tools which may have been used for the dressing of hides as clothing, constitutes the most convincing answer to Mr. Bryan's call for more evidence. It once more reminds us of the ignorance of man of the processes of nature, and sets a new boundary beyond which digging in the earth for more of truth must be directed. This Foxhall man, found near Ipswich, England, thus far known only by the flint implements he made and his fire, is the last bit of evidence in the direction of giving man a descent line of his own far back in geologic time. It tends to remove man still further from the great lines which led to the man apes, the chimpanzee, the orang, the gorilla and the gibbon. This is not guess work, this is a fact. It is another truth which we shall have to accept regardless of its effect. No naturalist has ever ventured to place man so far back in geologic time as this actual discovery of the Foxhall man places him. In this instance again truth is stranger than hypothesis or speculation.

---

[1] By Henry Fairfield Osborn, President of Trustees, American Museum of Natural History. *Science*. n.s. 55: 264-5. March 10, 1922.

Nearer to us is the Piltdown man, found not far from seventy-five miles to the southwest of Ipswich, England; still nearer in geologic time is the Heidelberg man, found on the Neckar River; still nearer is the Neanderthal man, whom we now know all about—his frame, his head form, his industries, his ceremonial burial of the dead, also evidence of his belief in a future existence; nearer still is the Cro-Magnon man, who lived about thirty thousand years ago, our equal if not our superior in intelligence. This chain of human ancestors was totally unknown to Darwin. He could not have even dreamed of such a flood of proof and truth. It is a dramatic circumstance that Darwin had within his reach the head of the Neanderthal man without realizing that it constituted the "missing link" between man and the lower order of creation. All this evidence is today within reach of every schoolboy. It is at the service of Mr.

Bryan. It will, we are convinced, satisfactorily answer in the negative his question: "Is it not more rational to believe in the creation of man by separate act of God than to believe in evolution without a particle of evidence?"

WHY I TEACH EVOLUTION[1]

It is often said that the moral and religious effects due to the teaching of evolution are disastrous; and even if this is not the case, that evolution, in itself, is not a suitable diet for college freshmen. As our experience does not confirm either of these assertions, it may be worthwhile to state why and how we teach evolution at Dartmouth.

For the sake of simplicity, and to assume undivided responsibility for this statement, I shall usually speak in the first person.

In the first place, I teach evolution because, in the practically unanimous opinion of those who in one way or another have devoted their lives to the study of nature-action, evolution, or world-growth, it is the only logical and unifying concept of natural phenomena there is.

It is a concept that not only helps us to understand what is going on within us and about us, but one that is constantly leading to new revelations in every field of human thought and practice. It is the one basic idea implied, or specifically expressed, in every phase of college and university teaching.

It is essential, therefore, that every young man at the outset of his college career should understand what that idea is, what are the chief facts on which it is based, and what are some of its social, ethical and religious implications.

In the second place, I teach evolution because I am confident, and it is a confidence fully justified by long experience, that the teaching of evolution is the only way to bring back a living God into those fields of human thought and experience from which the teachings of "high-brow" philosophy and "low-brow" religion are excluding Him with extraordinary thoroughness and rapidity.

---

[1] By Professor William Patten, Director of the freshman course in evolution, Dartmouth College. *Scientific Monthly.* 19: 635-47. December, 1924.

For there are only three basic concepts of the universe that are possible; either the world stands still in its tracks, as it was made and now is; or else it is going, sooner or later, to destruction; or else it is growing or moving onward in a unified, evolutionary way to what we call higher and better things.

I cannot see how there could be any evidence of God in a world that is stationary; and certainly not in a world that is on its way to destruction. If I believed in either of these alternatives, I cannot see how I could have any faith in the existence of a living God, or any worthwhile purpose in life.

On the other hand, the manifold evidence from all branches of science and from everyday human experience that the world is a living, growing world, everywhere and always unified by "natural laws," is to me the surest and the only available evidence that there is a God-like method and a God-like purpose in it all.

Thus the study of the ever-marvelous phenomena of evolution, done with a full appreciation of their deeper significance, should be the very best way of strengthening religious feelings and unifying the practically unanimous testimony of a surprising number of students who had already begun to call themselves hopeless and aimless "atheists," as well as those who were firm believers in the conventional doctrines of Christianity.

It is evident that without some hopeful, common-sense philosophy of life to vitalize and coordinate our educational system, root and branch, with a convincing and consistent terminology, that system will be fruitless and ultimately self-destructive. For without it, the more we learned the less we would know. Its highest teachings would culminate, as indeed they too often have culminated, in nothing but moral uncertainty and agnostic suicide. It would be a despairing confession that civilization has reached the end of its rope and is doomed to a crashing disaster commensurate with the magnitude of its superstructure and the inherent weakness of its foundations.

The mind refuses to contemplate the horrors of that disaster or the hopeless task of again climbing out of a bottomless pit of ignorance only to rediscover that life cannot logically justify its own existence, and that, after all, it is not worth the effort.

The third and perhaps the principal reason I teach evolution is because the methods of evolution exemplify the successful usage of the highest ethical and moral principles. They show us the ideal methods of democracy and of Christianity in successful operation on a universal scale.

Evolution, indeed the very essence of evolution, as we understand it, is a democratic, creative process that has been going on for an infinitely long time; it is still going on all about us, and in it we must play our own parts in cooperation with all its other working members. It is our supreme privilege, as intelligent beings, to understand something of its working principles; but we must understand them to some extent rightly before we may hope to use them successfully in our own creative efforts, of whatever nature they may be. . . .

If we attempt to summarize the creative methods of evolution and to estimate their directive influence on ourselves, physically and mentally, it is not surprising that the descriptive terminology of science inevitably changes into the moral and ethical terminology of idealism or religion.

This means that in the last analysis religion is merely a different name for science; the one being chiefly concerned with the immeasurable oneness or Godliness of nature-action, the other with its measurable manyness, or its distinguishable parts. But both, in their own distinctive ways, seek to discover, to interpret, and to utilize the same realities; and when that is rightly done they will be in functional agreement; that is, they will dictate to mankind essentially the same conduct and justify essentially the same faith.

And science has already visualized the same realities as religion. For in the larger aspects of nature-action, the scientist everywhere sees in operation that natural trinity of creators, destroyers and preservers, with the selective law presiding over all, which all great religions have graphically symbolized, in one way or another, as living gods and demons, and which have always served to direct human thought and human behavior. And the whole tendency of science, as that of religion, has been to reduce these several agencies to one operating cause, or one god.

Scientists everywhere see a certain individualistic variability or freedom of action in dead things and in living things, which eventually leads to creative innovation and invention. But that freedom of action is always subject to some external limitation and compulsion or to a restraining and guiding discipline which limits certain adventures by destruction and compels a more lawful and more righteous behavior.

There is always in evidence the creation of a new order of things by the cooperation of those more durable instrumentalities called heritages. And since they are eventually utilized as aids to something else, that process has the essential attributes of sacrifice, benevolence and altruism.

There is always in evidence some selective destroying, correcting or renovating of what is no longer fitting or adapted to the new order of nature; and always some selective stabilizing or preserving of the more righteous ways of doing things, which, because they are more righteous, are more fruitful or creative.

In accordance with our respective temperaments and the scope of our vision, some of us can see and can wisely profit by our seeing some one of nature's metabolic trinity at work much more clearly than either of the other two. Few of us can duly appreciate all three of them, especially when the destroyer operates on our most cherished possessions.

Thus science and religion offer the same incentives to action and have the same purposes to accomplish; and science expresses in her more comprehensive formulas precisely what all the great religions of the past and present have tried to express in their teachings, but without that sure and intimate knowledge of nature-action which science gives us and which is so essential to the truthfulness and sanity of any kind of religion.

I repeat, there is no difference between what is vital in science and what is vital in religion. In fact, underneath, science is religion and religion is science. The differences which cause so much confusion are in their protective coverings of dogmas, ceremonials and procedures. They are differences between people; between those with more or less scientific qualities of mind and those who have little or no such qualities.

And so, it seems to me that the study of evolution as a whole more than anything else will help to minimize the antagonism between religiously minded and scientifically minded people and will help them to work more peacefully and happily together. For young and old, for highbrow and lowbrow, the study of evolution makes life more significant and more beautiful. It justifies their faith and fortifies their ideals. It makes God a more imminent reality. It helps all of us to understand the purpose of life, and how to accomplish it.

That is why I teach evolution.

THE TRUTH OF EVOLUTION[1]

Intelligent teaching of biology or intelligent approach to any biological science is impossible if the established fact of evolution is omitted. Discussion of the methods by which evolution has been brought about is less essential, but the fact of evolution must be appreciated and the evolutionary point of view must be emphasized for any understanding of the growth of the universe, of the earth, of plants or animals; for any proper grasp of the facts of structure or function of living bodies as involved in medicine and in animal and plant husbandry; psychology, whether of normal or diseased minds, must constantly remember the processes of evolution; human societies, with their diverse customs, are unintelligible without the facts of their origins and changes, their evolution, God's growing revelation of Himself to the human soul cannot be realized without recognition of the evolutionary method He has chosen. Teaching in any field that deals with living things is disgracefully, yes, criminally, inadequate if it omits emphasis upon evolution. An intelligent teacher could omit such emphasis only at the expense of his self-respect and of his moral integrity. Such teaching would be criminal malpractice just as truly as would be a physician's failure to follow established sound methods of treatment because of fear of persecution by ignorant neighbors. For a teacher to fail to bear testimony to essential scientific truth is as unworthy, as cowardly, as essentially sinful as for a man to fail to stand by his religion. Truth is one, whether scientific truth or religious truth, and it calls for loyalty from every worthy man. The fact of evolution—of man, of all living things, of the earth, of the sun, of the stars—is as fully established as the fact that the earth revolves around the sun. Change, growth, evolution, is a fundamental, a pivotal truth in all nature. Those familiar with the phenomena of nature testify with unanimity to this. The great mass of evidence of different sorts from different sources, when once seen, is overwhelmingly convincing to any normal, human mind. It can be only the uniformed who fail to accept evolution as a fact established beyond doubt. On the other hand, there is great uncertainty as to the method by which evolution has been brought about. Many different factors have been in operation; among them probably the chief has been the mysterious intimate activities of the living substance itself about which as yet we know so little. As to the numerous "causes" of evolution and their relative importance there are about as many varieties of opinion as there are students of evolution. I am somewhat acquainted personally with nearly all the zoologists in America who have contributed extensively to the growth of knowledge in this field and I know many of the botanists and a goodly number of the geologists and I doubt if any two of these put exactly the same relative emphasis upon all the numerous interacting "causes" of evolution. But of all these hundreds of men not one fails to believe, as a matter of course, in view of the evidence, that evolution has occurred.

---

[1] By Dr. Maynard M. Metcalf, Johns Hopkins University. *Scientific Monthly.* 21: 291-5. September, 1925.

None of this, of course, has any bearing upon the question of God as the creator of the universe. It is only a matter of the gradual growth accompanied by divergence. The evidence is overwhelming that the latter was and is His method. God is just as truly and just as intimately acting in the gradual growing of a plant from a seed or of a man from a fertilized egg as He would be in creating the full grown plant or man all at once in a thousandth part of a second of time.

There is no conflict, no least degree of conflict, between the Bible and the fact of evolution, but the literalist interpretation of the words of the Bible is not only puerile, it is insulting, both to God and to human intelligence.

But the Fundamentalist would do much worse than insult God. He is in reality, although he doesn't realize this, trying to shut man's mind to God's ever-growing revelation of Himself to the human soul. He teaches, in effect, that God's revelation of Himself was completed long ago, that He long ago ceased to unfold His mind to men in new revelation. This is evil influence, criminal, damnable. Truth is sacred and to hinder men's approach to truth is as evil a thing, as un-Christian a thing, as one can do. The thought that God is at odds with Himself, that His revelation of Himself to men of old is at variance with His works in nature is as blasphemous as it was for the Jewish leaders to say of Jesus that "He casts out devils through Beelzebub, the prince of the devils." Jesus made short work of this attack upon Him.

No, the thing is not to attempt to guide God's self-revelation into channels of our own ignorant choosing, but is, rather, humbly and in a wholly teachable spirit, to seek His thought and Himself in nature, in history, in the vision of Himself He has given to men of old and is still giving to the humble-minded today. One of the greatest of God's revelations of Himself to men has come through His showing us His habit of producing results, by gradual growth by evolution, rather than by immediate fiat.

FREEDOM IN SCHOOL AND CHURCH[1]

We thought that forty years ago in America religion had been adjusted to the evolutionary theory, as it was adjusted in the sixteenth century to the far more startling Copernican theory. We thought that science had definitely yielded a large place to the unseen and intangible, and had agreed to Goethe's saying that "the universe divided by reason leaves a remainder." We thought that forty years ago it was established that the Bible was not a text-book of science—any more than is *Pilgrim's Progress* or *John Wesley's Journal.* Now, to the amazement of the whole world a large number of sincere enthusiasts are proclaiming that human progress is a delusion, that the ultimate catastrophe is close at hand, that all human institutions—home, school, state, and church—are soon to disappear, that the worse the world gets, the more reason we have to hope and are basing their pessimistic and non-cooperative attitude on the baldly literal interpretation of a few of the obscurest texts in the Bible.

---

[1] By William H. P. Faunce, President, Brown University. *World's Work.* 45: 509-13. March, 1923.

What this recrudescence of medieval despair may do to the denominational colleges in some sections of our country is becoming clear. In one college a new professor happened in his first lecture casually to use the terrifying word "evolution." Whereupon the whole class hissed him, and later explained apologetically that they had been taught that evolution and atheism are synonymous. In some colleges the control of teaching has been taken out of the hands of trustees and faculty and lodged in an annual mass meeting. But it is precisely the mass which needs to be educated and so is disqualified to direct education. In other colleges the teachers are cowed and silent because of the attacks of local publications which demand that all teachers repeat the shibboleths of a former generation or retire. The failure of the Kentucky legislature by a single vote to pass a law banishing modern science from the schools of that state, and the presentation of a similar bill in the legislature of Minnesota, show how fast and how far has gone the propaganda in favor of the world-view held in the sixteenth century. Political freedom has been achieved by whole nations and races since 1914. But freedom of teaching, liberty to declare the facts of history and biology and anthropology, as they are known to the foremost scholars in each department, is now threatened in the name of the religion which declares: "The truth shall make you free."

NECESSARY RESULTS OF THE MASS MEETING

The college which surrenders to the control of the mass meeting not only is unworthy of the confidence of the public, but utterly fails to prepare its students to face the realities of life. Sooner or later those students must meet the facts—in the popular pages of Wells and Van Loon, if not in the authoritative volumes of Thomson and Bateson and Osborne. A college which should still teach the science of ancient Israel might fittingly call to its chair of astronomy "Uncle Jasper" or make Dowie and Voliva professors of geology and history.

The colleges, however, will not permanently yield to obscurantism and reaction. Their roots are deep in the American principle, and all of them are striving to be true to the ideal embodied in 1764 in the charter of Brown University; "Into this liberal and catholic institution shall never be admitted any religious tests, but on the contrary all the members hereof shall forever enjoy full, free, absolute, and uninterrupted liberty of conscience." . . .

The American Association for the Advancement of Science, representing over a thousand of the leading scholars of America, has just declared its undeviating belief in evolution as the method by which the world as we know it acquired its present form. Probably every teacher of physical science in every college or high school in the northern states agrees with this declaration of the American Association for the Advancement of Science. Every boy or girl attending a high school north of Mason and Dixon's line is now being taught some form of the doctrine of evolution. The competent teachers of America and Europe are practically agreed that the physical world as we see it is a growth from simpler forms into more complex, and that so far as man is physical—of course he is vastly more!—he, too, is the result of the brain of an Aristotle and the heart of a Florence Nightingale.

Evolution

These scholars do not affirm Darwinism or any other "ism." They are quite ready to acknowledge that Darwin over-emphasized the struggle for existence in the organic world and that exaggerations and perversions of "natural selection" have given an excuse to imperialists, to exploiters of the weak, and to a pagan ethic which is all too prevalent. But perverse inferences do not disturb the fact. The fact is that the law of evolution—a doctrine as old as the Roman poet Lucretius, and the New Testament declaration of "first the blade, then the ear, then the full corn in the ear"—is now as firmly established among scholars as the law of gravitation. Both of these laws are merely statements of how matter moves and how it assumed its present forms. Neither law sheds any light on ultimate causes or affects the conviction of the church: "In the beginning, God." Neither law can be proved. Each is an hypothesis—a "guess," if one prefers to call it so, only remembering it was by guess that Columbus discovered America and that all the advances in human knowledge have been made. Both gravitation and evolution are hypotheses—modes of thinking, ways of explaining the facts—and will be cast aside the moment some better explanation can be found. (Einstein is today questioning the adequacy of the theory of gravitation.) Both are consistent with Christianity or Buddhism or atheism; neither has anything to do with the truth or falsity of any religion. Whether gravitation attracts inversely as the square of the distance, or not; whether species were created instanter, as coins are stamped in the mint, or were created by process, as a gardener grows roses—that has nothing to do with the great fundamentals of religion: "Thou shalt love the Lord thy God with all thy heart and thy neighbor as thyself."

Indeed the doctrine of evolution, rightly understood and interpreted, is today one of the most powerful aids to religious faith. It has delivered thousands from perplexity amounting to despair. It has supplanted the old paralyzing conception of a "world-machine," a world mechanical and lifeless, grinding out human destiny without end. In place of that soulless mechanism we now have a growing organism. In the words of John Fiske, "The simile of the watch has been replaced by the simile of the flower." A developing world, still in the process, ceaselessly unfolding, still to be shaped by human purpose and effort—that is the inspiring conception now placed in the hands of the church by modern science, a conception which formed the basis of the first Christian parable of "The Sower." Science is not yet able to discern a world-soul or a creator; it leaves that to religion. It has nothing to say about the purpose and goal of life or the spiritual presence in all things, which is the vital breath of religion. But it has shown us a universe alive, progressing, climbing with many backward steps toward "one far off divine event." The doctrine of development has cleared away most of the difficulties in Old Testament ethics, and enabled us to reconcile teachings which, given in different centuries, are yet united in one book. It has furnished the church with a powerful apologetic, which many of our leaders are now using.

Evolution and Religion

Dr. W. W. Keen, the noted surgeon, in his last book entitled *I Believe in God and in Evolution* has brilliantly assembled the facts and then declared: "The attitude of the church and especially of the clergy toward science, and toward the origin of man is of incalulable importance.

. . . There is serious danger, if present tendencies triumph, that intelligent people—those who eventually mould the thought of the world—will be alienated from the church and finally driven out of it." Dr. S. P. Cadman of Brooklyn, a staunch preacher of the "faith once delivered," affirms: "Of all the theories science has put forth, that of evolution was the most capable of being reconciled with Revelation. . . . Renewal, growth, fertility, contingent perfectibility; what are these but spiritual terms imported into the natural world? Terms with which the New Testament abounds at every turn."

SCIENCE AS A DEFENSE FOR RELIGION

The church fails to realize that science is offering to religion theories which may be so interpreted as to afford a powerful defense of the fundamentals in Christianity. The pulpit should eagerly welcome such aid. Science is year by year dissolving matter into more subtle and spiritual forms. It resolves the opaque mass of a bar of steel first into molecules, then into atoms, then into electrons or fields of force, and shows us all known forces as probable forms of one eternal energy.

And in the modern form of the ancient theory of evolution we have been offered a key to the universe which unlocks more chambers than any other key yet discovered. Of course, evolution cannot explain the ultimate cause of anything. It can simply tell us how things came into their present form.

Rightly understood, this doctrine brings back the divine into the daily and hourly changes of the physical world and gives us such a vision of the spiritual element in human life as the world never had before. The divine is no longer as far distant as 4004 B.C.—according to the childlike chronology of Usher—but is at work in every "flower in the crannied wall." The divine is seen in the early crudities of ethics and religion, just as architecture began with the tents of early wandering tribes, and the music of the harp and piano began with a cord stretched across a seashell. We can now understand how the lie of Abraham and the adultery of David did not hinder their being the moral leaders of their time. We can understand how the slaughter of the Canaanites with every circumstance of modern Prussian atrocity was "commanded" by God. We are no longer troubled by the contradictions between the ethics of the Mosaic law and that of the Sermon on the Mount. We are undisturbed by any documentary theories of ancient composition and undismayed by any digging in Egyptian sands. We have found the clue—or at least a clue—to the whole unfolding panorama of history, and it proves to be the method of the best pedagogy of our generation and the method foreshadowed by the prophet Hosea: "When Israel was a child, I took him by the arms and taught him how to walk."

To refuse stubbornly such aid and to set the church against it, is to repeat the old error which declared Copernicus wrong because God "hath laid the foundations of the earth," and Galileo wrong because "He maketh his sun to rise," and Columbus wrong because the Bible speaks of the "corners of the earth."

EXCERPTS

In all modern history, interference with science in the supposed interest of religion, no matter how conscientious such interference may have been, has resulted in the direst evils both to religion and to science, and invariably; and, on the other hand, all untrammelled scientific investigation, no matter how dangerous to religion some of its stages may have seemed for the time to be, has invariably resulted in the highest good both of religion and of science.—*From the Introduction of Andrew D. White's "A History of the Warfare of Science with Theology in Christendom."*

Does this doctrine of creation by evolution take God away from the world? It seems to me that it brings Him a great deal nearer. There is no chasm of six thousand years between the evolutionist and his Creator. The evolutionist lives in the creative days and sees the creative processes taking place before him—*Lyman Abbott, in "The Theology of an Evolutionist."*

When one reads an article like Mr. Bryan's one feels, not that the Bible is being defended, but that it is being attacked. Is a 'cello defended when instead of being used for music it is advertised as a good dinner table? Mr. Bryan does a similar disservice to the Bible when, instead of using it for what it is, the most noble, useful, inspiring and inspired book of spiritual life which we have, the record of God's progressive unfolding of his character and will from early primitive beginnings to the high noon in Christ, he sets it up for what it is not and never was meant to be—a procrustean bed to whose infallible measurements all human thought must be forever trimmed.—*Rev. Harry Emerson Fosdick, in pamplet "Evolution and Mr. Bryan."*

The "Fundamentalists" forget that the Bible is a spiritual treasure-house, not a scientific manual. They ignore the Christian doctrine that the Holy Spirit is still at work among men, leading them to an ever fuller understanding of truth; with a fear that is really anti-Christian, they assume that a fuller knowledge of truth will weaken rather than establish the Christian revelation. The inevitable result of their attempt to repudiate sound science in the name of religion will be that tens of thousands of college boys and girls in America will repudiate Christianity in the mistaken belief that it is bound up with pitiable ignorance.—*Right Rev. E. W. Barnes, D.D., Sc.D., F.R.S., Lord Bishop of Birmingham. Nature.* 116, *sup*: 74. *July* 11, 1925.

All those who have enjoyed an education steeped in the spirit of freedom will hope that the threat of that freedom in the schools of the United States may be averted. The idea that teachers should be prohibited from teaching the doctrine of evolution because it is opposed to a certain interpretation of the Biblical account of the Creation, seems to progressive minds on this side of the Atlantic both ludicrous and preposterous. To the minds of all progressive churchmen, any such prohibition would be regarded as a set-back to religious progress and a denial of that liberty of opinion in matters of religion which it has taken centuries to win. That such a threat should come from the United States is history's latest irony.—*Rev. S. M. Berry, D.D., secretary, Congregational Union of England and Wales. Nature.* 116, *sup*: 83. *July* 11, 1925.

Reflection will make it plain that on such a magnificent conception of God suggested by our increased knowledge of our universe, can be raised a *new understanding and faith in Jesus as a revealer of the infinite personality.* Confidence in the gospel is strengthened rather than weakened by our knowledge of the forces in the midst of which we live. It is idle to be concerned over origins. They can never be changed. Religion is interested in destinies, and these we may control. *The gospel is in harmony with evolution,* for both are revelations of God's will.

He who understands the Bible in accordance with actual facts has no difficulty in realizing the truth of its teaching that God is in the processes which have produced and sustain mankind. It is only those who are ignorant, both of the origin and nature of the Bible and of the facts in our universe, who are terrified lest science should make them lose their faith. To all others, knowledge is light rather than darkness. Just as we live in a universe of light, and make our own night as the earth gets between us and our sun, so do we walk in religious darkness only when our prejudices and our ignorance get between us and reality. *The faith which Jesus evokes is a faith in the Father who made the heavens and the earth.* The Christian's God of Love is the scientist's God of Law.—*Shailer Mathews, Dean, Divinity School, University of Chicago. How Science Helps Our Faith. p.* 14-15.

The Rev. Father John J. Wynne, editor of *The Catholic Encyclopedia,* who upholds the principle of teaching evolution as a scientific theory of human origin and disapproves of attempts to legislate against teaching it, is quoted in the *New York Times* as saying, "the subject of evolution is neither outlawed nor ignored in *The Catholic Encyclopedia,* nor in the general book edited by me under the title of *Universal Knowledge.* Commenting on the subject of coercive legislation, he said:

> We are not in favor of making laws against the teaching of evolution if it be taught properly. Evolution should be taught as a scientific hypothesis, with the facts which tend to support it and the facts which tend to discredit it impartially displayed. It should neither be preached as dogma nor attacked as heresy.
>
> Nor are we in favor of having evolution tried in the courts. It is a matter for scientists, rather than jurists, and scientists are very few in number and slow to speak.

—*Literary Digest.* 86: 34. *July* 4, 1925.

So far as I know Methodist thought in evolution, it is that the materialist can never banish God out of the processes of nature. With God in these processes, to the scientist may well be left the duty of telling us what the processes are, the conviction meanwhile deepening, throughout our ministry at least, that the general outline of evolutionary processes sketched by scientists will have to be conceded as true and should be welcomed as aids to religious thinking.—*Francis J. McConnell, D.D., LL.D., Bishop, Methodist Episcopal Church, in "The*

Methodist Church and Fundamentalism." Homiletic Review. 87:94-6. *February,* 1924.

I am also one of those who believe that there are thousands in America and elsewhere who find in evolution a stay and support of their deepest religious convictions. If this be so—if, as I think, it be plain matter of history vouched for by these thousands of religious people—the position, as I see it, is this: by excluding evolutionary teaching in the schools and colleges of this or that State, an avenue to the full and free development of religious faith and observance is arbitrarily barred by legislative enactment.—*Professor C. Lloyd Morgan, D.Sc., F.R.S., Emeritus Professor of Psychology, University of Bristol. Nature.* 116:103. *July* 18, 1925.

In the correspondence which has been published about the Tennessee State law on the teaching of evolution, a great deal has been written about the importance of the liberty of the teacher. With all that we must cordially agree. But let us also plead for the liberty of the taught. Let us insist that in a free country the young men and women should be trained to think, encouraged to discuss, and free to form an opinion. The dogmatic teacher produces dogmatic pupils, and a State that insists upon dogmatic teaching produces a race of citizens deprived of that liberty of thought which is essential for its progressive development.—*Professor J. Stanley Gardiner, F.R.S., Professor of Zoology and Comparative Anatomy, University of Cambridge. Nature.* 116, *sup*: 81. *July* 11, 1925.

The very genius of liberty which inspires representative bodies and is the breath of their own existence, must prevent them from killing the genius of liberty which inspires places of education and is the breath of *their* existence. A legislature cannot be told what it is to teach. Public opinion is a great thing; but there can be no healthy public opinion without discussion, and no genuine discussion without a genuine and free education. If a legislature tries to kill liberty of teaching, it stultifies itself—based as it is itself on freedom of speech. If public opinion seeks to stifle freedom of thought and expression, it commits suicide; for public opinion can only be formed by freedom of thought and expression. A democratic State cannot kill liberty or stifle freedom of thought without killing itself and stifling the breath of its own life.—*Ernest Barker, D.Litt., Principal of King's College, London. Nature.* 116, *sup*: *79. July* 11, 1925.

Every year the old proofs of evolution are reconfirmed and new ones found. Evolution is proved by all the evidence of comparative anatomy, embryology, paleontology and geographical distribution, evidence which increases in amount every year. The evidence from any one of these fields of science alone is sufficient to prove evolution; from them all together it is overwhelming.

All this applies to the evolution of man as well as to the evolution of plants and lower animals. The old evidence of human evolution from lower animal forms, based chiefly on comparative anatomy and embryology and the existence and suggestive distribution of various living human types, has been in recent times especially confirmed by the numerous finds of the fossils of prehistoric, anciently prehistoric, man. The series from Pithecanthropus to Homo sapiens is being steadily revealed, with every promise of the early future filling in of the remaining gaps. There has been also, in recent times, a notable addition to the proof of man's relationships to other animals through physiological discoveries, especially those relating to blood characters.—*Vernon Kellogg. New Republic. April* 11, 1923.

Scientific investigation is just part of the struggle in which spiritual reality manifests itself; and the realisation of this brings science, particularly pure science, very near to religion. It is only when science becomes dogmatic that it assumes an attitude which seems to deny the existence of spiritual reality. We find very little of this dogmatism in the writings of great men of science, but much more of it in the desiccated science of systematic text-books and popular expositions. For example, the idea is spread abroad in such writings that natural science, unlike philosophy, advances by a steady process of addition. We have only to look back on the history of natural science to see how utterly misleading this idea is. The progress of science is just as much strown with the remnants of discarded theories as is the progress of philosophy; but, in spite of this, continuity of development is evident in the histories of both of these subjects. Surely it must be the same with theology.—*John Scott Haldane, F.R.S., Honorary Professor and Director of the Mining Research Laboratory, Birmingham University. From paper read to the Conference of Modern Churchmen, at Oxford, August* 28, 1924.

The Fundamentalist complains that his faith and that of his children is being shaken by the discoveries and conclusions of the biologist. This faith is based on the teaching, directly or indirectly, of the clergy whose statements the Fundamentalist accepts as truth. The biologist has a faith also which is very precious to him and that faith is based on observation of nature and the experimental study of nature's phenomena, and for him the answers that nature gives to his questions are more significant than the assertions of the clergy.

Fundamentalists accept what they have been told about the accuracy of description of the origin of the universe given in the Scriptures. The biologist will accept the authority of no man, not even the man who presumes to state that the description of the origin of the world in the Bible is the "word of God." The biologist has his own idea of what is the word of God. He believes it to be the testimony of nature. This testimony has to be wrung, as it were, out of nature, but in this way evidence can be secured and has been secured that is incontrovertible.—*Dr. C. B. Davenport, Director, Department of Genetics, Carnegie Institute of Washington. Scientific Monthly.* 21 : 135-6. *August,* 1925.

Editorial comment on the Scopes case seems to indicate a complete misunderstanding of the purposes and strategy of the defense. "A Wandering Defense" is the characterization of the *New York World,* which presents the issue as a clear one—whether "the State of Tennessee may establish the Bible of the Fundamentalists as the official standard of truth in the public schools."

The defense, far from having wandered, was based upon three definite propositions: First, that the law was unconstitutional because it attempted to make the Bible the test of truth; second, that the law was unconstitutional because in the light of present-day knowledge of evolution, to be adduced from scientists, it was unreasonable; and third, that the evidence of Mr. Bryan and other students of the Bible would show not only that there was no inconsistency between an acceptance of the evolution of man and of the Bible, but would also show that the law was indefinite as well as unreasonable, because no two persons understand the Bible alike.

Many would have presented the simple issue that the law on its face violated constitutional guaranties. The defense went further and sought to show that such laws result in hate and intolerance, that they are conceived in bigotry and born in ignorance—ignorance of the Bible, of religion, of history, and of science.—*From article by Arthur Garfield Hays, "The Strategy of the Scopes Defense." Nation. August* 5, 1925.

"Of course, like every other man of intelligence and education I do believe in organic evolution. It surprises me that at this late date such questions should be raised."—*Woodrow Wilson, in letter to Professor Winterton C. Curtis, August* 29, 1922.

Science is simply intensified and enlightened common sense, and our knowledge of the development of life, called Evolution, stands in no more antagonistic relation to Religion than does Astronomy, Geology, Chemistry or Physiology, History even, all of which have in turn run the gauntlet of opposing "fundamentals," based on tradition or ignorance.

To the scientific mind, the essentials in Christianity are found in the teachings of Jesus—faith, hope, courage, and above all Love. It is founded on the doctrine of divine fatherhood and human brotherhood, and is the base of our conception of human values. In the enumeration of fundamentals, little reference seems to be made to what Jesus taught, mainly to traditions of his origin.—*David Starr Jordan, President and Chancellor Emeritus, Leland Stanford Jr. University. From "Evolution and Theology." Sunset.* 52:15. March, 1924.

I desire in a non-controversial spirit to emphasize the vast importance of the freedom of learning in the hope that our people, instinct with the spirit of liberty, will not lay hands on our public schools and State universities to set obstacles in the path of knowledge. It is a plausible statement that if the state provides institutions of learning, it is entitled to determine what shall be taught in them. Let the taxpayers, it is said—the majority, it is meant—define the curriculum. Of course, there is power to regulate the curricula in public educational institutions, and this power is exercised by boards of education and various educational authorities under legislation in all our States. And, while I shall not attempt, as I have said, to discuss the constitutional questions raised by particular legislation which will come under the appropriate judicial review, the constitutional criterion is sufficiently apparent, and that is whether legislation with regard to courses of instruction, as to what may and may not be taught, has relation to a legitimate object within the State power and is not to be condemned as arbitrary and capricious. Laying on one side the constitutional question of power, always considered with every appropriate presumption in favor of its exercise, we have the even more fundamental question of the proper standards of State action in the field of education and how its authority should be used in a free society even if there were no constitutional restrictions. Should it not be used with the intelligent and sole purpose to promote the acquisition of knowledge, to make broad the avenues of research, to disseminate the information which the toil of countless laborers in the difficult fields of learning has acquired?—*Charles Evans Hughes, in his address "Liberty and Law" before the American Bar Association, at Detroit, Michigan, September* 2, 1925.

The leaders of this movement are not trying to protect the faith of the young; they are trying to impose by law their peculiar religious faith upon our system of education.

Faith comes from within, and cannot be imposed from without by creed or law. A faith whose light pales before the truths of science, a faith which cannot stand contest with the theory of evolution, can have had no origin in the mind of God.

Infidelity will not come from the study of science or of constantly revealed facts. Infidelity will come to haunt the aisles of faith only when children grown to maturity realize that they have been denied access to full knowledge by any church or dogma. If God be God He will not be disturbed by the truth.—*From address of*

Dudley Field Malone before the convention of laymen of the Unitarian Church, Lenox, Mass., September, 1921. *As reported in the New York Times.*

Those who set the Bible over against any particular scientific theory or discovery ordinarily forget how many things in the Bible they themselves do not believe. Had Mr. Bryan listened to Thomas Aquinas, in the thirteenth century, he would have been assured that the Bible proved that he, as a heretic, should be sent to the stake. Had he lived in the sixteenth century, he would have agreed with Luther that the Bible established the necessity of burning witches, taught that disease was caused by devils, and that the sun revolved around the earth. Had he been a Southern clergyman before the Civil War, he could have justified negro slavery on the ground that Ham was condemned to serve his brethren. As one reviews these facts the Bible arguments lose their force. The Bible is not a manual of geology, comparative anatomy, embryology, or prehistoric archæology, but a groping after the Eternal, and if Mr. Bryan would only devote a little time to the history of thought, he would readily see that any older notions about the Book of Genesis need not interfere with his accepting man's animal origin.—*James Harvey Robinson, author of "Mind in the Making." From article in Harper's Monthly.* 145: 68-74. *June,* 1922.

Mr. Bryan says the people of the state have the right to preserve their faith for their children. Have they? Have they the right to compel their children to learn one side of a controversy only and perhaps to debar them from knowing the side which is the truth? Here are two plans whereby God may have created the world, each sponsored by a distinguished array of citizens. Is it liberty or Bolshevism to say, as Tennessee has done, our children shall not hear about one of these plans? Is it freedom or a kind of persecution from which our grand-fathers escaped.—*Carrie Chapman Catt, in an article "Evolution—Fifty Years Ago" from The Woman Citizen. July* 11, 1925. *page* 7.

The campaign which Mr. Bryan is leading to-day is fundamentally an attack on the foundations of the Christian religion. He does not mean it to be, of course. But when he insists that the foundations of religion are in the first two chapters of Genesis he has narrowed the foundations and weakened them to such a degree that the whole structure is imperiled. No wonder the Fundamentalists report that their children become unbelievers when they go to college. It is not surprising. They send their children out into the world of knowledge impressed with the belief that if any statement in the Bible is not true then their whole religion is untrue.

Is that the way to defend a faith? Is that the way to make religion secure? It is a strange way, indeed, to bring consolation to mankind to tell them they can believe nothing unless they believe also that the Chaldean science of 4,000 years ago is literally true. . . .

If Christianity had no broader foundation than the Fundamentalists claim, it would not to-day be the living faith of millions. Christianity, in spite of the fears of the Fundamentalists through the ages, is a living faith because it rests on a far solider foundation than the Fundamentalists imagine.—*From editorial in the New York World. July* 17, 1925.

French scientists, answering a call of the liberal organ *Le Quotidien,* have joined in a vigorous protest against the Scopes prosecution in Dayton, Tenn. A dozen leaders, including the rector of the University of Paris, Paul Appell and Mme. Curie, already have signed the document, which reads:

> The undersigned protest energetically against the violation of the liberty of thought constituted by the Dayton prosecution. They consider that, although Darwin's theories are open to discussion in many respects, no modern man can possibly afford

to ignore them. They have helped form contemporary scientific thought, and the notion of evolution which they established on the double ground of observation and experience is one of the most fecund acquisitions of the nineteenth century.

Of all forms of oppression, that which limits the imprescriptible rights of the mind is the most odious and the vainest. If every one has a right to discuss conclusions of science, no one is entitled to forbid others to formulate them and submit them to the judgment of men. No political or religious power can claim a right to prohibit any particular form of human thought.

Rising in indignant protest as men of science against the Dayton prosecution, we defend not only one of the most fecund of scientific theories but more especially the rights of free thought, which never had been questioned by the great American nation.

The signatories, in addition to those heretofore mentioned include Prof. D'Arsonval of the College de France, Prof. Aulard of the University of Paris, and Profs. Brunot, Hadamard, Imbeaux, Janet, Langevin and Lumiere and Gen. Sebert, all members of the Academy of Science.—*From special cable to the New York World. July* 21, 1925.

The National Council of Congregational Churches went on record here to-day as believing there can be no conflict between science and religion and deploring "any attempt of the State or Federal Governments to interfere with the teaching of widely accepted scientific theories."

A unanimous vote of approval followed reading of the resolution which set forth the views of the churches, and prolonged applause greeted its adoption.

The resolution pledges the churches to the "conservation of the spiritual values embodied in the time honored statements of Christian truth," but the belief is expressed that "God makes Himself increasingly known through the patient investigations of modern scholars."

"We declare our conviction," it said "that there is and can be no conflict between science and religion. We deplore any attempt of the State or Federal Governments

to interfere with the teachings of widely accepted scientific theories and encourage all reverent students in their search for the truth in whatever field, assuring them that we welcome all light that God can give us; and commend to our ministers and people the preaching and acceptance of a gospel consistent with modern scholarship."
—*From the New York World. October* 29, 1925.

WITHDRAWN

Date Due

AP 2 [illegible]			
AP 27 '72			
JA 11 '73			

MARYGROVE COLLEGE LIBRARY
Selected articles on evolution
575 P51
3 1927 00034923 0

575
P51

MARYGROVE
LIBRARY
DETROIT, MI